COAL AGE

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The gross payroll of a small coal-mining concern averaged about $10,000 dollars a month. Deducting rent, commissary stoppages, etc., the actual amount of cash paid out was about $5000 dollars monthly. The man in charge of the payroll was an old-line timekeeper who had been with this same concern for years. Whenever there was a change in the wage schedule, he familiarized himself with it, and although he was supposed to rate his payroll each month from the wage sheets, he seldom did this, but instead would write in rates on the current roll from the previous one, or from memory.

One day the superintendent in looking over the roll, which he didn't do often, happened to notice that rockmen were being paid $3.05 a day. On asking the timekeeper to refer to his wage sheet, he found that the correct rate was $3.50. The timekeeper could offer no explanation other than that he must have written it $3.05 instead of $3.50. On looking back it was found the incorrect rate had been paid for several months and as a result, many men had left the employ of the company.

Of course, the unfortunate timekeeper had to admit he had been rating each roll from the previous one without referring to the wage sheets. Much of his rating was done from memory. This is a common fault of the average timekeeper who feels that because of his long service and familiarity with conditions, he knows rates well enough to make up his payrolls, extend time, etc., without checking each rate against the wage sheets as approved by the superintendent and management at the time wages were fixed. This instance was only another case where "Familiarity bred contempt."

How many auditors and superintendents of coal-mining companies are careful enough about the serious business of accuracy in payroll methods, and in the use of preventive measures to safeguard the rating of rolls, extending of time, etc., so that the cost sheets reflect the actual expenditures of the company?

Would it not be easy with some concerns for the man who knows how, to beat the company by working as a weigher, and without even exciting suspicion, run two or three dummy checks worth $40 or $50 apiece to him every month. How could he do it? By having one or maybe two confederates to draw the money—not on regular paydays, but through the medium of back-pay statements, for as a rule the identification of men who draw back pay is given far too little attention and the man who is onto the game could use this method.

PAYROLL LEAKS are too often the source of loss. The following suggestions may help:

1. Make the timekeeper rate his payrolls from rate sheets approved by the superintendent and executive officials.

2. Make the mine foreman approve each payroll after it is closed and before it is paid, both as to number of men and rates allowed.

3. Don't let the timekeeper pay off or have a hand in it. If he is honest he won't want to. If he is not honest, the fact that he can make up the roll and pay it off is all the opportunity to be crooked that he needs.

4. During the time of pay, have the foreman present to identify the men and don't hand one man another's money.

5. After the pay hour, have the foreman look over the undistributed envelopes and make note on each as to whether the man who did not draw his money actually worked.

6. On settling back-pay items secure a complete identification of the men paid through this channel.

It is safe to say that if these simple rules are followed closely, at least a few common losses will be avoided. At the same time the men will be pleased to feel that care is taken to see that they are compensated for all they do, and that the payroll work is both accurate and preventive of rascality.

The Matanuska River Coal Field by Districts

By W. R. Crane*

SYNOPSIS—The Matanuska field appears to vary greatly in value, the Youngs Creek district having seams of unworkable thickness. The thickest bed is on Eska Creek and this is 15 ft. thick. The coal lies on an extremely uneven bed and has been ripened like the Bering River coal by igneous intrusions.

Chickaloon Creek is the largest tributary of the Matanuska River, its course being for the greater part of its length slightly east of north. Aside from draining a large area of mountainous country, it has as its source the Chickaloon glacier, which, however, furnishes but a small volume of the water of this stream, as is shown by the clearness of the current.

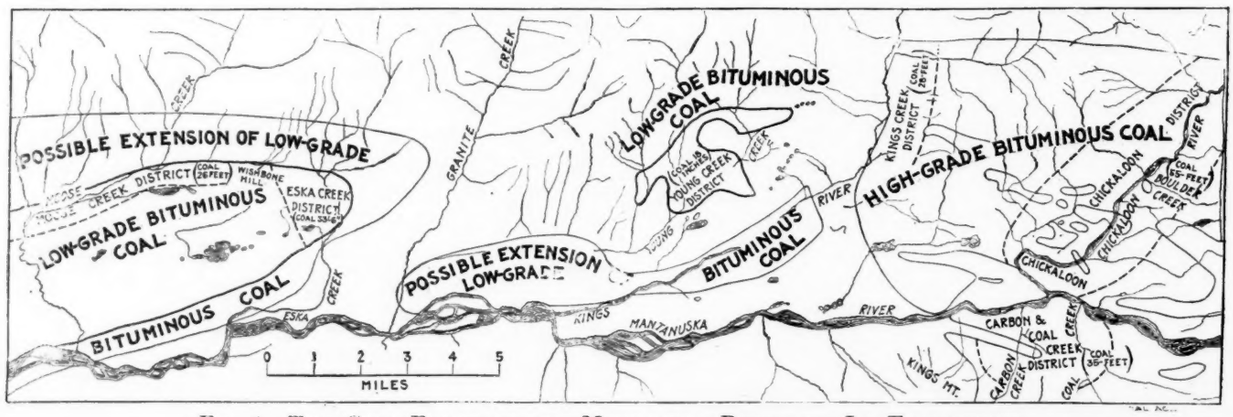

Fig. 1. The Coal Fields of the Matanuska River and Its Tributaries

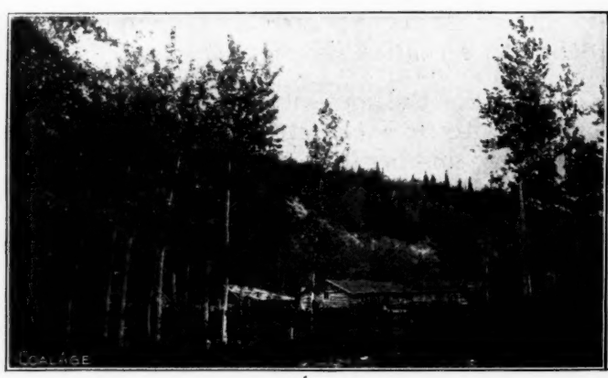

Fig. 2. Watson's Camp in Chickaloon Creek, a Branch of the Matanuska

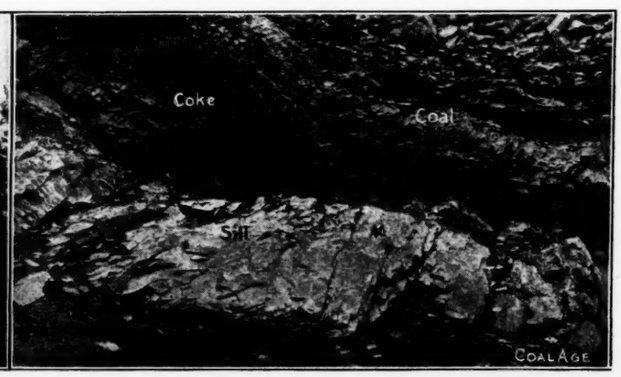

Fig. 3. The Diabase Sill under the Coal Bed Has Coked the Coal

The principal occurrence of coal in this locality is at the Watson Camp, about 1½ miles above its junction with the Matanuska River. See Fig. 2. The coal outcrops at this point along a steep bank some 100 ft. high. The dip of the coal beds is quite variable, ranging from 40 deg. to the vertical and in one instance at least a reversed fold appears to have been formed.

Chickaloon Field Has 55 Ft. of Coal

According to Dr. Martin[1], and I have verified the statement myself, the number and thickness of the coal beds occurring at this point are as follows: No. 1, 5 ft. 4 in.; No. 2, 4 ft. 10 in.; No. 3, 8 ft. 9 in.; No. 4, 5 ft. 6 in.; No. 5, 9 ft. 4 in.; No. 6, 2 ft. 6 in.; No. 7, 10 ft. 10 in.; and No. 8, 2 ft. 8 in., making an aggregate of 49 ft. 9 in. Not all of the beds listed are of sufficient value to work at least throughout their full extent, owing to variable thickness and the occurrence of shale partings and other impurities. Further, a large amount of impure coke occurs at this point; a coal bed affected by the intrusion of a diabase sill, is shown in Fig. 3.

These coal beds constitute the bulk of the coal so far located in the Chickaloon Creek district, and make a most attractive showing as to amount, also a number of them are of excellent quality and in such condition as to warrant extensive exploration and also, probably, commercial development.

Another 4-ft. coal bed is reported as outcropping on the banks of Chickaloon Creek, some 26 miles above the mouth of Boulder Creek.[2] The total amount of coal in this district is then very close to 55 feet.

Igneous Intrusion Made These Tertiary Coals Mature

While many occurrences of igneous intrusions in the form of sills following the lines of stratification are

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[1]U. S. Geol. Surv., Bull. No. 289, pp. 20 and 21.

[2]U. S. Geol. Surv., Bull. No. 289, p. 25.

to be found in this field, and particularly in this locality, the only instance observed where a sill (more properly called a dike) cuts across the intervening strata between beds is to be found here. See Fig. 4. This occurrence is of peculiar interest in that it shows that an intrusion may be encountered at any time in the process of mining, although the coal bed worked may be apparently free from such irregularities. This is especially to be feared where a sill is known to occur in the strata either above or below the bed worked. Aside from changing the character of the coal, even transforming it into coke, what is fully as bad would be the weakening of the rock formations by fissuring and burning.

Probably no part of the bituminous-coal area has been subjected to such extensive rock movements as at this locality in the Chickaloon Creek district. The rock and coal strata stand at high inclinations, even being folded so abruptly as to be crumpled up, while to add to the general disturbance the igneous sills have been intruded, badly burning and consequently weakening the formations. See Fig. 5.

Tunnels driven to intersect the highly inclined coal beds show the strata standing either vertically or nearly

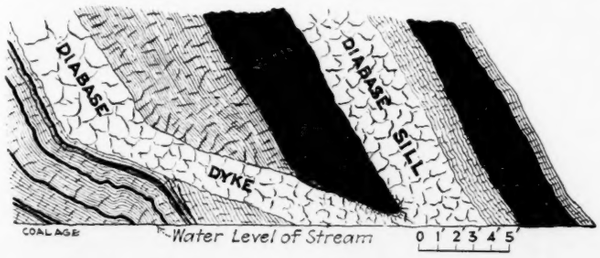


FIG. 4. A DIKE IN CHICKALOON DISTRICT

FIG. 5. VIEW SHOWING DIABASE SILL AND STEEP PITCH OF STRATA

so, and further demonstrate that they have been weakened and loosened to such an extent that water entering the tunnels in some instances finds more or less ready exit through the strata to the level of the creek.

Another irregularity observed both in the coal beds and the top-rock is shown in Fig. 6. In this particular instance, the mass of foreign material occurs in the middle of a coal bed and its appearance suggests that a mass of molten iron had at one time run into the coal. It is yellowish-red in color, more or less seamed and contorted as though it had forced its way through an irregular opening or crevice. It is not, however, of igneous origin as the condition of the adjacent coal shows, but was undoubtedly deposited with the coal and its associated strata. As an impurity in the coal, it could readily be separated, but when it occurs in the top-rock, its smooth, undulating surface presents no bond or connection, and is, therefore, a decided element of weakness and danger. The fall of large masses of top-rock exposing such an irregularity, demonstrates the ease with which the rock separates from it. See Fig. 7.

The most common irregularities occurring in this district are the shale partings, the majority of which are several inches in thickness, although many are much larger.

As would be expected from the disturbed condition of the formations, the coals of this district are soft and friable, resembling in this respect and to a marked degree the coals of the Bering River coal field.

THE KINGS CREEK DISTRICT

Kings Creek lies about five miles to the west of Chickaloon Creek, and the coal locations occur from 9½ to 9 miles above the junction of this creek with the Matanuska River. The character and occurrence of the coal of this locality, as previously mentioned, resemble very closely those of the Chickaloon Creek district.

There are four distinct and apparently separate coal beds outcropping in this locality, two on the east side

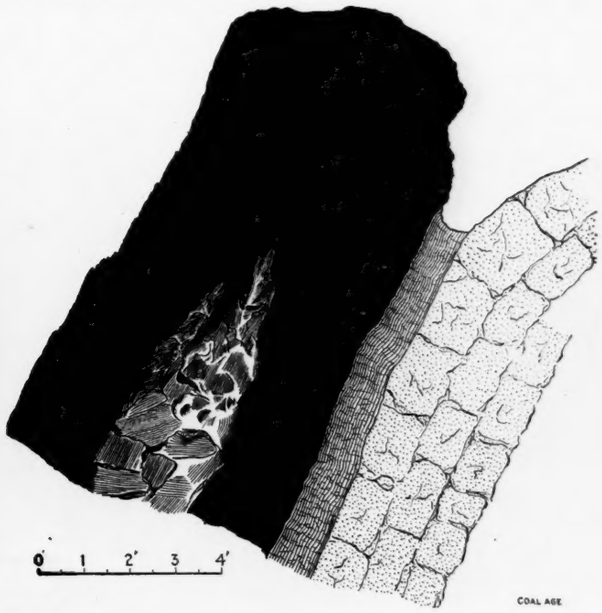


FIG. 6. HORSE IN COAL OUTCROP ON CHICKALOON CREEK

of the creek and two on the west side. It is possible that one or two of these beds may be extensions of the other outcrops, but owing to the disturbed condition of the beds and extensive coverings of slide and moss, it is difficult to correlate them accurately. However, the thickness of the beds, beginning with the one furthest up the creek, is as follows: 6 ft., 10 ft., 2 ft. and 10 ft. The two last mentioned are separated by some 16 ft. of shale. If these outcrops are of separate beds the aggregate thickness of coal in this locality is 28 feet.

The coal occurring on the east side of the creek is very soft and friable, while that on the west side is

stronger and would probably mine into lumps of fair size.

On the east side of the creek, the coal beds outcrop on a cliff which is capped by a flow of igneous rock varying in thickness from 20 to 50 ft. See Fig. 8. An igneous sill, together with the flow, have coked a large part of the coal beds. However, the action of the heat does not seem to have been uniform throughout the coal seams as portions of the beds at certain points and the entire beds at other points have not been affected. A section of one of the coal beds that has been changed to coke below and but slightly altered above is shown in Fig. 9.

ly described on Kings Creek and 3½ miles above the junction of Youngs with Kings Creek.

The only coal found on this stream are two thin beds, 12 in. and 6 in., respectively, and separated by about 15 ft. of shale. The coal beds occur in a synclinal trough with a dip of 20 deg. The coal is, at least in places, of inferior grade, for it contains numerous nodules of clay and pyrite.

While not associated directly with coal beds, an interesting geological feature was observed, namely, a dike of igneous rock cutting beds of shale and sandstone. See

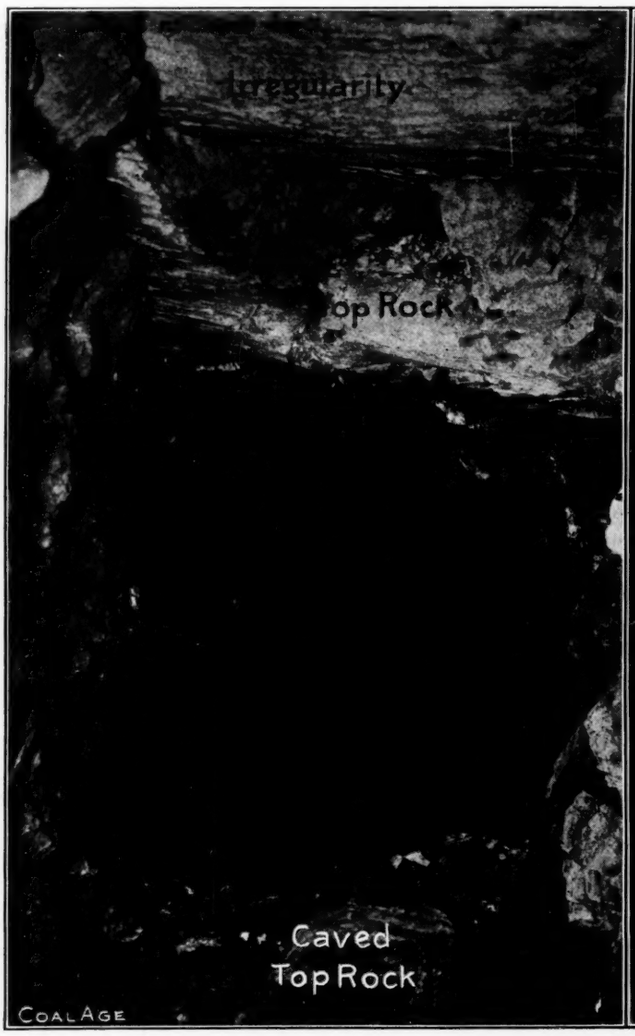


FIG. 7. INTERIOR OF TUNNEL SHOWING IRREGULAR MASSES OF FOREIGN MATERIAL IN ROOF

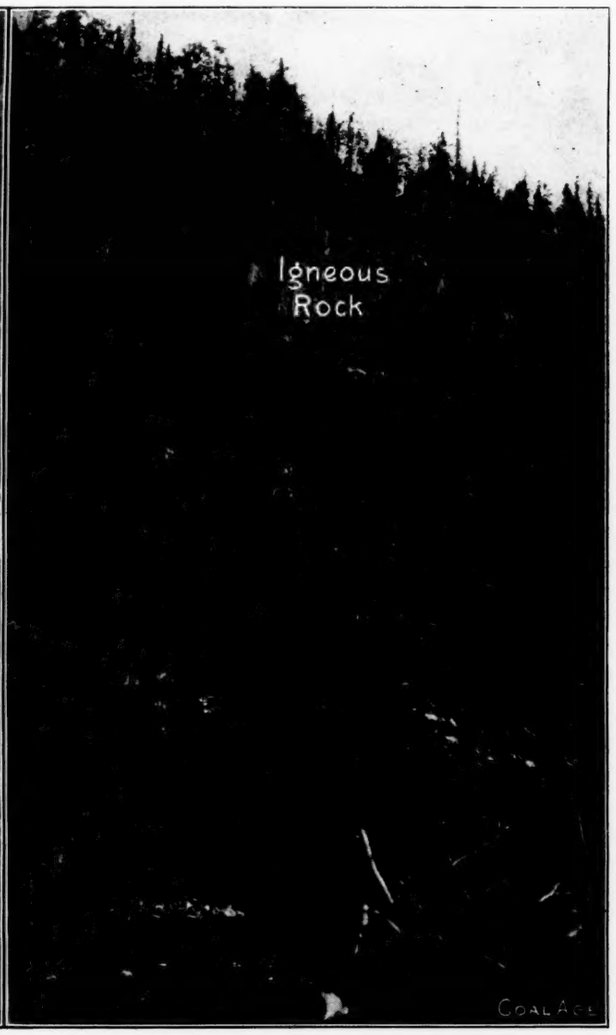


FIG. 8. A VOLCANIC FLOW CAPPING COAL-BEARING STRATA, KINGS CREEK VALLEY

Aside from the diabase sill and igneous flow, the principal irregularities and those of most frequent occurrence are shale partings. These are highly bituminous and of considerable thickness and when associated with the coal often resemble it so closely as to render their separation from the coal difficult.

THE YOUNGS CREEK DISTRICT

There is little of interest to be said regarding the occurrence of coal on Young's Creek. The locality where coal occurs is about 3 miles west of the coals previous-

Fig. 11. The shale is highly bituminous and contains small bands of coal, which appear to be of a low grade. The dike has intersected the formation approximately at right angles with the stratification, although without any material disturbance or distortion of the strata. To one side of the main body of the dike a small stringer of similar material occurs, the course of which is very much less regular than that of the large dike and indicates the termination of either a branch of the former or an entirely separate one.

The often noted tendency of fissures to assume par-

allelism with lines of stratification on traversing bedded deposits, is evident in the case of this small dike. Further, two isolated masses of igneous material also occur close to these dikes, being probably branches of the larger one, which cut the strata at these points, the

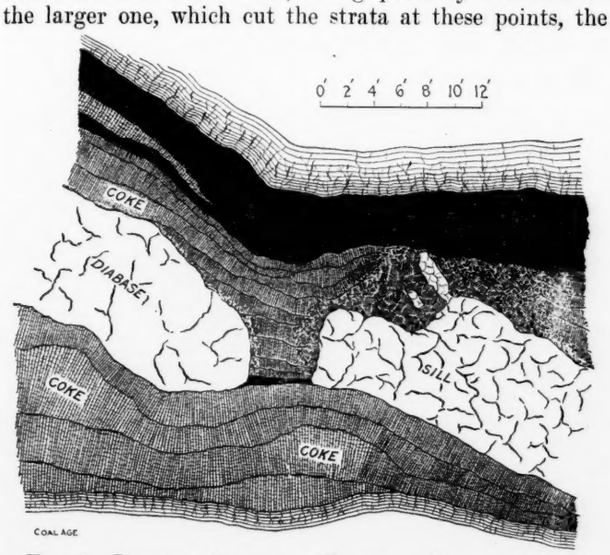


FIG. 9. DIABASE SILL AND NATURAL COKE IN COAL BED IN KINGS CREEK

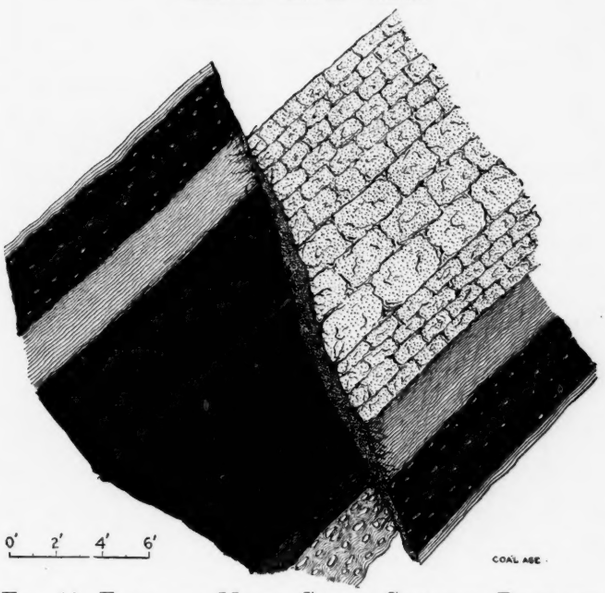


FIG. 10. FAULT ON MOOSE CREEK, SHOWING DISPLACEMENT OF BEDS

connection with the dike either having been eroded or occurring in the strata beyond the face of the section. In either case the connection is invisible.

Mention is made of these dikes in this connection as they occur at no great distance from the coal beds in this district, and also occur in coal-bearing strata; they might, therefore, as likely be found cutting the coal beds as intersecting the barren beds adjacent.

THE ESKA CREEK DISTRICT

The coal occurs on Eska Creek some 8 miles west of the Youngs Creek field, being 3 miles above the junction of Eska Creek with the Matanuska River.

The coals of this locality are bright, but lack the luster of the fuels of the Chickaloon and Kings Creek districts. They are of good appearance and are hard, mining in large, blocky masses with the production of only a moderate amount of small coal. There are, however, numerous dull bands in the coal beds, that look suspiciously shaly.

The various coal beds occurring in this district proceeding from that of the lowest elevation upward are as follows: No. 1, 7 ft. 6 in.; No. 2, 7 ft.; No. 3, 3 ft. 8 in.; and No. 4, 15 ft. 4 in., giving an aggregate thickness of 33 ft. 6 in. of coal. The last coal bed mentioned, or No. 4, is separated into two benches by a 12-in. parting, and further is associated with three other

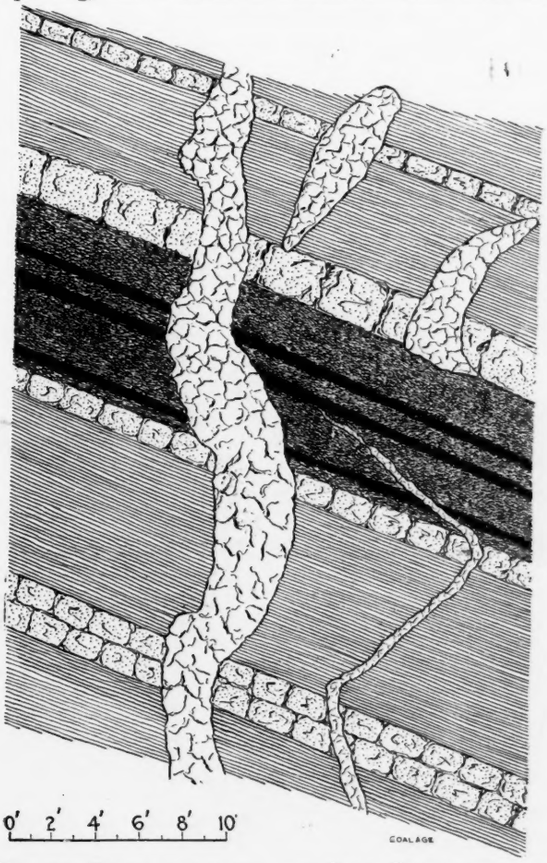


FIG. 11. DIKES THROUGH THE COAL SEAMS IN THE YOUNGS CREEK FIELD

coal beds of 2, 3 and 3 ft. in thickness, but separated from one another by shale partings ranging from 3 to 15 in., in thickness, and from No. 4, by a parting of 12 in. of shale and impure coal.

Numerous partings of shale and impure coal, both in and associated with the coal, constitute the principal irregularities noted.

The coal beds lie in a gently pitching synclinal trough, the dip of the lower or down-stream side of the beds being 40 deg. to the northwest, while on the upstream side of the trough the dip is 30 deg. to the southeast. The pitch of the trough is into the bank, a bad condition of affairs owing to the difficulty of keeping the working free from water if it should flow in from the creek.

THE MOOSE CREEK DISTRICT

Coal is found on Moose Creek, about 5 miles west of the Eska Creek locations, and at a distance of 4½ to 6 miles above the junction of Moose Creek, with the Matan-

uska River. The outcrops of the coal beds occur on the cliffs and steep bank of the east side of the creek.

The coals are of similar grade to those of Eska Creek, but hardly of equal value, according to analysis. They are, however, hard and firm, as is demonstrated in one instance by the uncovered outcrop extending into a swift mountain stream with little appreciable disintegration.

The number and thickness of coal beds occurring in this district, beginning with the first outcrop encountered on passing up the creek, are as follows: No. 1, 1 ft. 7 in.; No. 2, 1 ft. 9 in.; No. 3, 3 ft. 6 in., No. 4, 11 ft., and No. 5, 8 ft., giving a total thickness of 26 ft. The coal given in Nos. 1 to 3, inclusive, occur in the same section but separated by partings of shale and impure coal, with other stringers of coal of a few inches in thickness, interstratified throughout the section. The 8-ft. bed is also

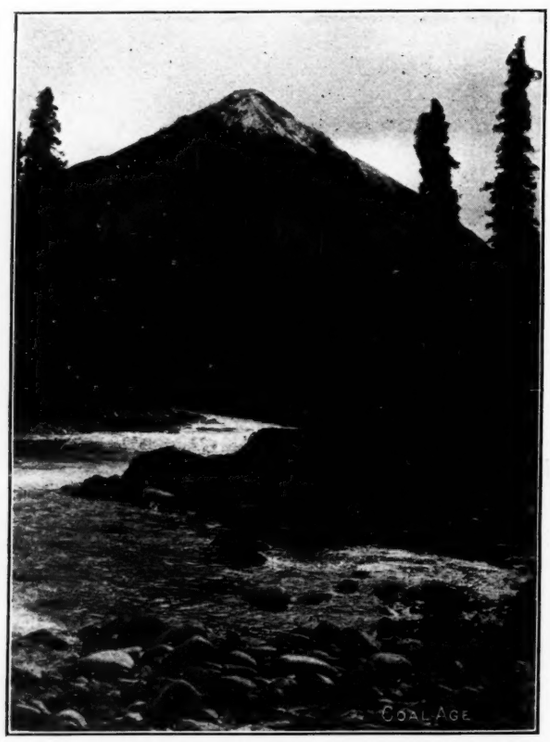


FIG. 12. KINGS MOUNTAIN IN THE MATANUSKA COAL FIELD

badly broken up by partings, which would seriously affect mining. The 11-ft. bed is remarkably free from partings, containing but one of 1 in. thickness. The beds Nos. 4 and 5 are the workable coals of this district, but stand at high inclinations, particularly the 11-ft. bed.

The only irregularity noted in this district aside from the numerous partings of shale is a fault, which cuts the 11-ft. coal bed some 12 to 14 ft. above the level of the creek. See Fig. 10. This fault cuts across the stratification of the rock and coal strata at an angle of 80 deg., and consequently in the opposite direction to the dip of the strata, which below the fault plane dip 45 deg. to the southwest, while above the fault plane the dip is to the southeast. The displacement of the strata is practically the full width of the coal bed.

Directly above the 11-ft. bed of coal occurs another seam, which contains nodules of iron ore and is more or less disturbed, but the ore is of no economic importance.

The coal bed occurring furthest down the creek dips into the cliff at an angle of about 35 deg., and outcropping as it does but a few feet above the level of the creek soon passes below water level, which would permit much water to enter the workings by seepage if developed by openings at or near the creek.

THE CARBON AND COAL CREEKS DISTRICT

This district lies on the south side of the Matanuska River and almost directly opposite the junction of Chickaloon Creek with the Matanuska. It embraces the whole coal-bearing area and not only that adjacent to the two creeks, after which it is named, but all coal occurrences to the east and west.

The coal of this locality is similar in character to that found in the Chickaloon district. It is but natural to expect then that the coals have suffered considerable disturbance such as folding and faulting and the intrusion of igneous sills. The inclination of these coal beds throughout this district varies from 40 deg. to 75 deg. The effect of the igneous sills in coking the coal is not as extensive as across the river in the Chickaloon district, the zones affected varying from a few feet up to 14 to 16 ft.

The number and thickness of the coal beds occurring in this locality, beginning with Coal Creek and proceeding up the Matanuska River, are as follows: No. 1, 5 ft.; No. 2, 8 ft. 6 in.; No. 3, 7 ft. 6 in.; No. 4, 7 ft.; No. 5, 6 in.; No. 6, 6 ft. 6 in., giving an aggregate thickness of 35 ft. The three coal beds, Nos. 4, 5 and 6, are closely associated, being separated by shale strata varying in thickness from 4 to over 40 ft. Further the coal beds in all cases are broken up into benches by shale partings, some of which approach a foot in thickness.

Battery Renewals

Speaking before the Coal Mining Institute of America, H. H. Clark, electrical engineer of the Bureau of Mines, said:

An important item in the cost of upkeep of portable electric mine lamps arises from the deterioration of the battery plates or elements. This is most noticeable in storage batteries having lead plates. The natural depreciation of these is hastened by overcharging or overdischarging or charging at too high a current. Another trouble that is experienced with the acid batteries is the destruction of the contacts by the acid electrolyte. Even in nonspillable batteries and those using gelatin electrolytes, a certain amount of acid often gets upon the contacts, and rapidly corrodes and destroys them. Much of this trouble may be eliminated by designing the battery properly, but it may be prevented even more completely by exercising care to keep the batteries clean and the terminals occasionally wiped off with vaseline or some similar substance.

Storage batteries which make use of other electrodes than lead and other electrolyte than sulphuric acid are not materially injured by overcharging or overdischarging and do not give trouble by the corrosion of the contacts. All that the bureau has ever tested, however, have shown a more rapidly decreasing voltage curve than the lead batteries, which means that the candlepower of the lamp when the battery is first charged will be much higher than it will be near the end of the discharge.

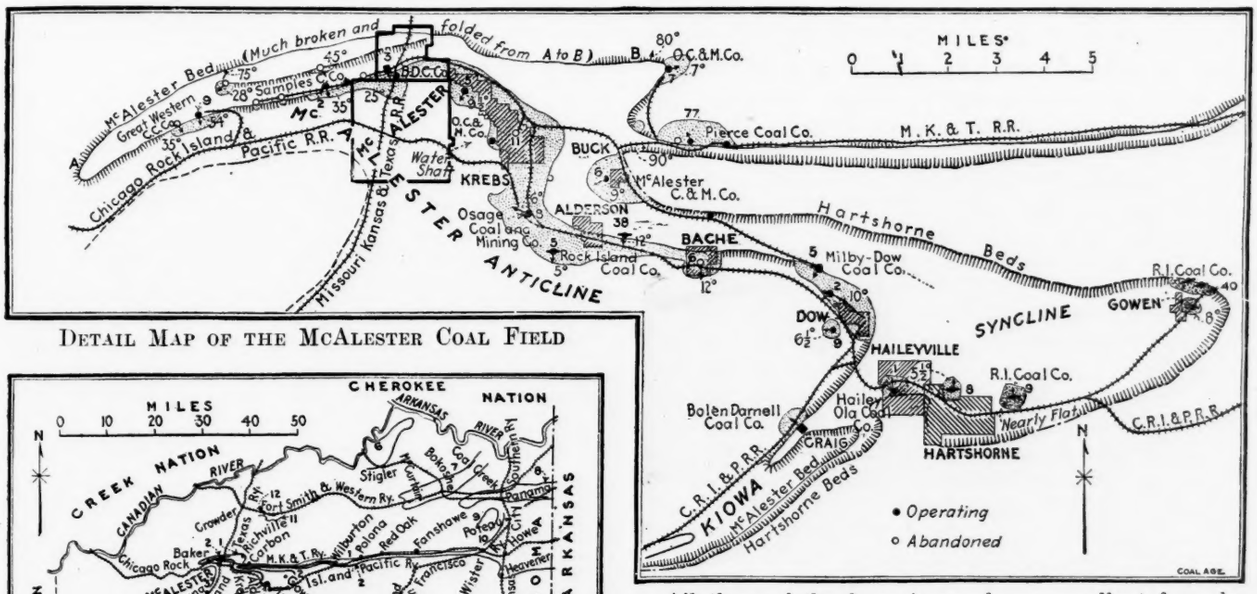
The McAlester Coal Field in Oklahoma

By Geo. M. Brown*

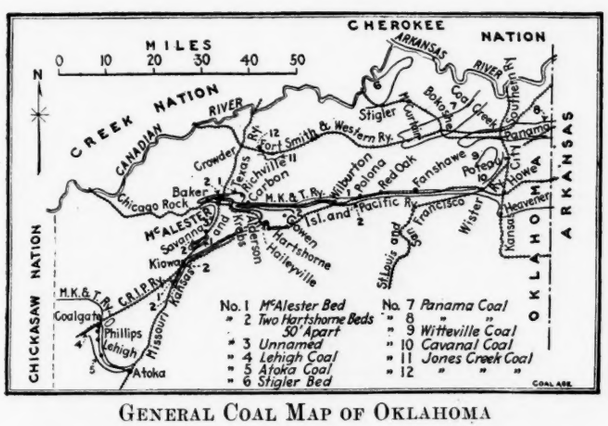
SYNOPSIS—The McAlester and Hartshorne coals are two of the highest-grade fuels west of the Mississippi. The seams are relatively thin, however, and are worked under comparatively heavy cover. There is considerable gas and the coal is quite explosive in character. Shooting off the solid is practiced.

When the United States Geological Survey finished its work on the segregation of the coal lands in the Choctaw Nation, it established the following points:

"The coal should be of a quality and hardness to create a demand for its use for commercial purposes."



Detail Map of the McAlester Coal Field



General Coal Map of Oklahoma

"It should be thick enough to be worked successfully."

"Its structure or position and depth should assure profitable mining."

Geology

In accordance therewith governmental reports indicate four workable beds of coal in the McAlester district having a total area of approximately 67,000 acres, and a tonnage of 460,000,000. Of this area 30,400 acres are at present unleased, and the remaining 36,700 acres are being worked by various coal companies, who pay a royalty of 8c. a ton into the treasury of the Choctaw Nation.

Of the four workable seams in the McAlester district, the lowest is known as the Lower Hartshorne Vein. It outcrops in the district for fully 50 miles, and has a thickness ranging from three to six feet. The coal is clean and free from impurities. The roof is a hard, compact shale, locally replaced by sandstone. The floor is shale or clay. Similar in quality and character of roof and bottom, is the Upper Hartshorne bed lying about 50 feet above the Lower seam. Both of these veins will average about 4½ ft. in thickness.

The McAlester Vein is found about 1250 ft. above the Hartshorne horizon. It has a much longer outcrop in the district, and the coal is much more accessible. The quality is better, and there is less sulphur than in the Hartshorne coals; it is also much harder and slightly thicker.

All three of the foregoing coals are excellent for coke making. The fourth vein is the highest in the district, and lies to the southwest of McAlester. Its development has been limited because of the better advantage of the other veins.

PROXIMATE ANALYSES OF COALS IN THE McALESTER DISTRICT*

Seam	Moisture	Vol. comb.	Fixed carbon	Ash	Sulphur
Lower Hartshorne.....	1.36	39.48	53.87	5.29	2.36
Upper Hartshorne.....	1.43	38.15	50.76	9.66	1.38
McAlester	1.91	37.26	56.44	4.39	0.72

*United States Geological Survey Reports.

As shown on the accompanying map, there is a wide fold entering the southeast part of the district and bearing northeast. This is called the Kiowa syncline. Near Dow, it sweeps eastward to Gowen, forming a nearly flat basin near Hartshorne, at depths of 500 to 600 ft. North of the Hartshorne basin we find the upward fold known as the McAlester anticline, which bears due west to the Krebs district. It then deflects northward to the north side of Krebs, and then west to the vicinity of Baker, about five miles west of McAlester.

At Buck, on the Hartshorne seams, the fold bears sharply eastward, the coal dipping northward from 45 deg. to 90 deg. The McAlester seam, however, being farther from the axis of the fold, has a dip of only 15 deg. to 20 deg. The north pitch of the McAlester seam

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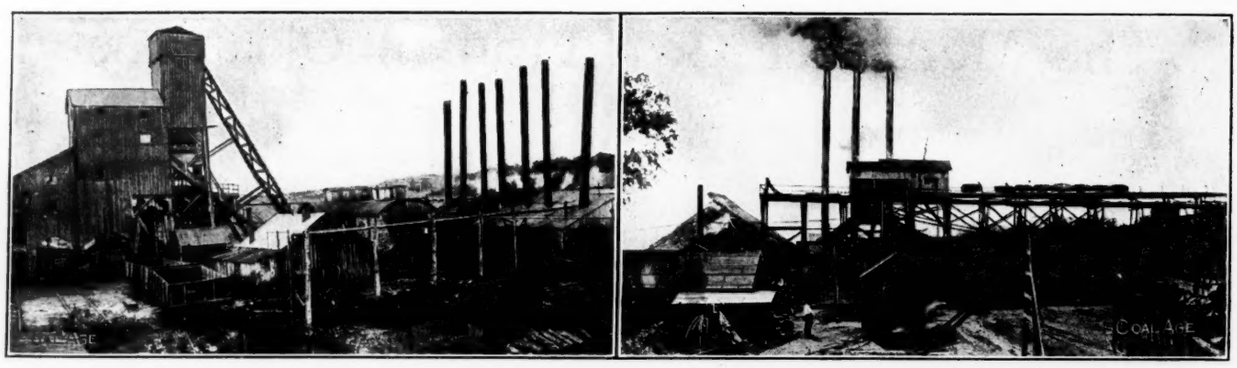


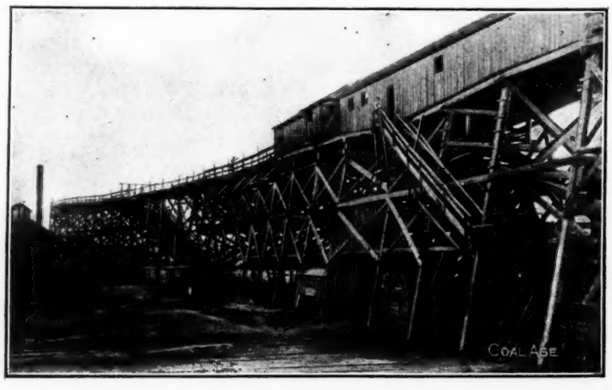
MINE NO. 5 OF THE OSAGE COAL & MINING CO., AND MINE NO. 40 OF THE ROCK ISLAND COAL MINING CO.

is badly twisted and broken from Baker to Mine No. 7 of the Osage Coal & Mining Co., and is economically worthless.

At Baker, as shown on the map, the McAlester seam dips 54 deg. Two miles east of this the dip is 35 deg. In North McAlester the dip has decreased to 25 deg., and at Mine No. 5 of the Osage Coal & Mining Co., it is only 9½ deg., bearing almost due south. At Krebs we find a wide sweep in the fold, so that the coal at Mine No. 8 is pitching 6½ deg. toward the northwest. Just west of Alderson the fold turns again, and at Mine No. 5 of the Rock Island Coal Mining Co. we find a dip of 5 deg. southward; further east it varies in magnitude and direction as indicated by the arrows.

The early development of the field was in the district near Krebs, and fully a dozen slopes and several shafts were in operation at one time. The slopes were only driven a few hundred feet, and the shafts were sunk with regard only to present easy profits. Affairs went well at that time, but carelessness resulted in water breaking through from the outcrop, and in severe squeezes.

Gas and dust explosions were common, too, in the early days; the real danger of McAlester coal dust was only



BOLEN DARNELL COAL CO.'S MINE NO. 3

too well shown in the terrible explosion at No. 11, Krebs, in 1892. Ninety-six men were killed.

MINES AND MINING CONDITIONS

Mining in the district has become more settled in recent years, and now we find the following companies working mines:

The Osage Coal & Mining Co. is operating two shafts, Nos. 5 and 8, and one slope, No. 7, near Krebs. However, all the coal is obtained from slopes and planes inside of the shafts. The output is about 1200 tons a day.

The Rock Island Coal Mining Co. is operating slope No. 38, and Shaft No. 5, at Alderson, Shafts 7 and 8, at Hartshorne, and a group of slopes at Gowen. Of the latter, No. 40 is the largest producer in the state. The total output of the company will amount to about 3200 tons a day.

The Great Western Coal & Coke Co. operates a very steep slope at Baker. The pitch is 54 degrees.

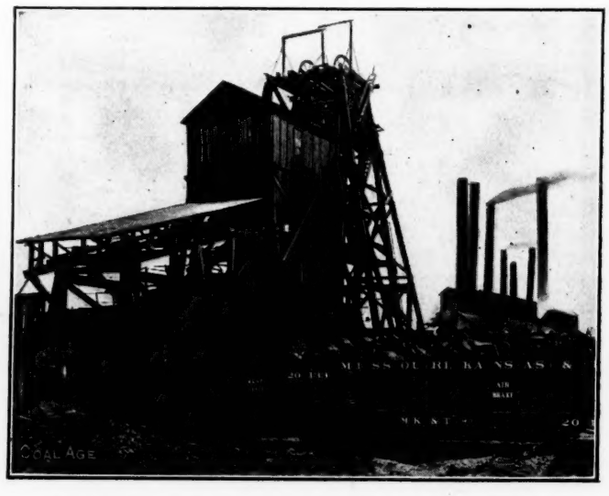
The Bolen Darnell Coal Co. operates slopes at McAlester and Craig.

The McAlester Coal & Mining Co. operates one shaft at Buck.

The Hailey Ola Coal Co. has a shaft mine in Haileyville.

The Milby Dow Coal Co. operates Slope No. 5 and Shafts Nos. 2 and 9 at Dow; No. 9 is one of the most complete plants in Oklahoma.

Besides those listed, there are several individual opera-

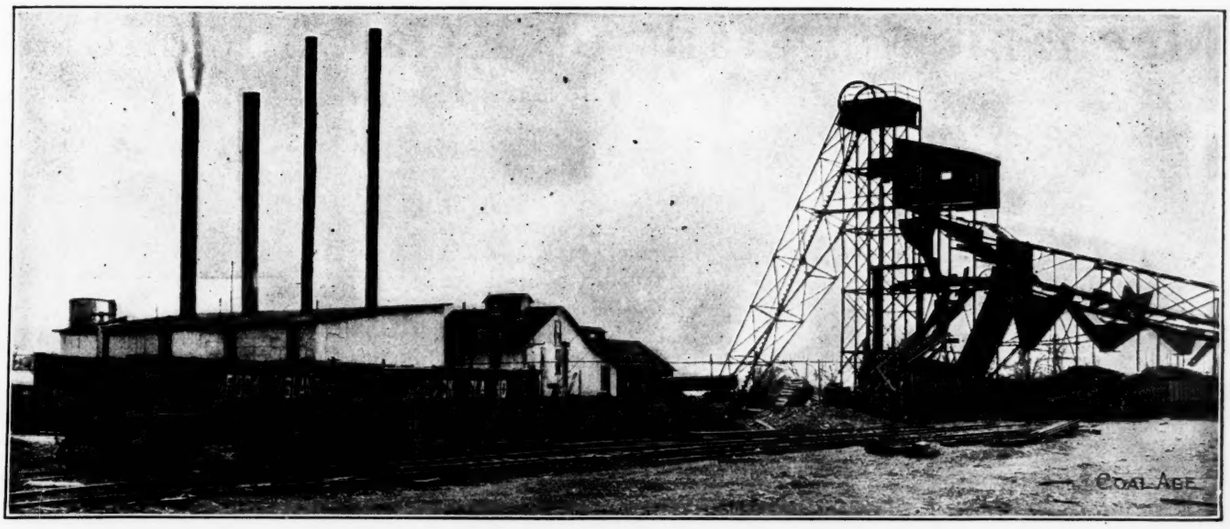


MCALESTER COAL & MINING CO.'S MINE NO. 6

tors working along the outcrops of the Hartshorne and McAlester seams.

Mining in Oklahoma has the following conditions to meet: Gassy mines, very explosive dust, shooting off the solid, heavy overburden, excessive use of blasting powder, unwise legislation, and strong labor unions. Plenty of air, and much sprinkling has reduced the gas and dust dangers a great deal. Much can yet be done, however.

Shooting off the solid presents an interesting problem.



MINE NO. 9 OF THE MILBY DOW COAL CO., ON THE MCALESTER SEAM AT DOW, OKLA.

Everybody knows its dangers, and the mine inspectors are strongly against it, but the unions stand directly opposed to its being abolished. Let an operator install an

COAL-MINING STATISTICS IN THE McALESTER FIELD*

	1909	1910	1911	1912
Tonnage	1,049,717	1,038,519	681,665	791,310
Number employed	3,178	3,094	2,923	2,933
Number killed	37	18	13	11
Number injured	53	39	28	43
Number killed per 1000 employed	11.6	5.8	4.5	3.75
Number killed in U. S. per 1000 employed	4.00	3.92	3.73	3.15
Number killed per 1,000,000 tons	35.2	17.3	14.7	13.9
Number killed in U. S. per 1,000,000 tons	5.79	5.66	5.48	4.29
Number kegs powder used	64,980	60,722	38,327	45,108
Tons of coal per keg	16.2	17.3	17.7	17.5
Other explosives, in pounds	....	30,993	47,574	47,129

*This table has been prepared from the annual reports of the mine inspectors. The figures for the United States are quoted from the report on Coal Mining Statistics by Frederick W. Horton, of the Bureau of Mines. The death rate for the field is high. Less coal per keg of powder is being shot from the solid, and more explosives than ever before are used. The use of black powder is declining, however, and at present many mines are installing machines and using the permissible powders. This, it is believed, will reduce the amount of explosives, and increase the production of the district.

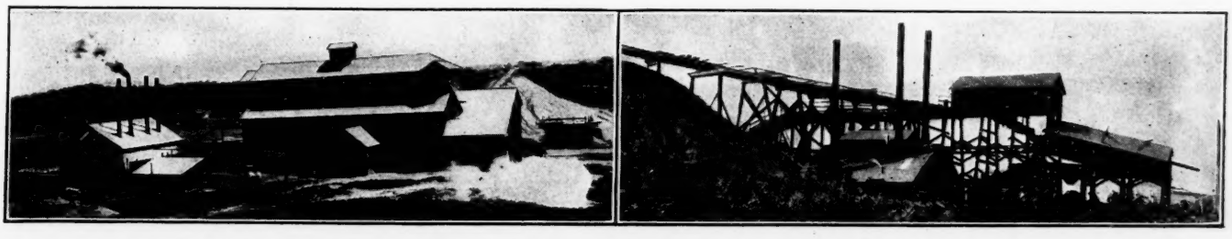
electric shot-firer, and immediately the miners want a deeper hole and more powder, and little they care what the result to life and property is. Injuries from falls of rock have increased 25% since shooting off the solid gained a foothold in Oklahoma.

Recently a petition was filed by the miners for a referendum vote on that part of the recent legislative act known as Section 18, which prohibits solid shooting, limits the diameter of the bore hole, and specifies undercutting. It is noteworthy that other states are fast doing away with solid shooting, and that mining men in this district, who expressed themselves against the practice a few months ago, are now most earnestly urging the referendum. However, the operators are fast installing machines, and the future seems to promise nearly all machine coal.

Heavy overburden is a cause of much worry and efficient recovery is a big problem. Let us note here a few shafts whose depths are: 555, 600, 487, 530 and 660 ft. Within all these there are slopes whose bottoms reach depths ranging from 750 to 1000 ft. Longwall has been successfully tried in this field.

The mining laws are sometimes very much of a handicap and some parts need revision. Employers' liability acts are sometimes unjust, and the labor unions as a whole completely disregard contracts. More rigid inspection and stricter discipline will help matters much in this field.

Nearly all of the coal in the McAlester field is prepared by passing it over shaking screens. As a rule four sizes are made. The slack passes through a 5/8-in. screen, the pea through a 1¼-in. screen, the nut through a 2½-in. screen. A glance at the following table will give an idea of the distribution of the sizes:



THE OSAGE COAL & MINING CO.'S WASHER AND THE GREAT WESTERN COAL & COKE CO.'S MINE NO. 9

PRODUCTION OF COAL IN 1912—SHORT TONS

Lump	Nut	Pea and slack	Run-of-mine	Unclassified
261,857	78,106	194,673 (36.4%)	213,294	43,380
		Machine-Mined Coal		
14,563	2,180	8,040 (32.4%)	43,830	

Some parts of the various seams are more friable than others, and at some mines, a slack percentage of from 38 to 50% is often reported. Machines will, no doubt, lower this amount greatly and obviously will render the coal-preparation problem much easier to solve.

Mechanical Details of a Gasoline Motor

By R. O. Hodges*

SYNOPSIS—Because no power house is needed for the operation of a gasoline motor, it is customary to dispense with the services of a capable mechanical engineer. It must be remembered, however, that such a locomotive is a power house on wheels. Many parts of the engine, radiator and transmission cannot be copied from the automobile owing to the severity of the service. The article shows how the mechanical details have been modified to meet mining conditions.

The gasoline mine motor possesses certain advantages not present in any other form of haulage. Its flexibility is extreme. It can go wherever the rails are of sufficient weight to carry it. It does not require trolley wires, rail bonding, a power plant, or a pipe line, or even a charging station, and it can do several hours' work without needing a fresh supply of gasoline and water. In many cases the smaller motors will run for an entire eight-hour shift with one filling of gasoline. The motor has the same pulling capacity in relation to its weight that is possessed by any other form of traction haulage. It can go just as fast, if not faster, than either electric or compressed-air motors, and it is quite easy, under ordinary mining conditions, to prevent any leakage which would cut down its efficiency.

A Power Plant on Wheels Needs the Attention Given to One in a Power House

In regard to the endurance and reliability of gasoline mine motors, our experience has been contradictory. Many of our locomotives have been operated since they were installed at a low repair rate and have been as reliable as their owners could desire. A few have been expensive and not at all reliable. Some of these failures have unquestionably been our own fault. Even with the best intentions in the world, every manufacturer occasionally lets material or workmanship which is not up to standard pass through his shop, and this danger is greatly increased when the machine which he is manufacturing is as completely new as is the gasoline mine motor. Others of these machines did not give steady service owing to the fact that a motor requires intelligent attention at regular intervals, and this provident care was not given it.

It must be remembered in comparing this type of haulage with the other and better-known systems, that we have a complete power plant mounted on four wheels, and that in other installations power is being utilized in a substation on wheels but being manufactured in another place. If the same amount of attention were given the gasoline mine motor that is given to the entire power plant in a compressed-air or electric installation, its endurance and reliability would be fully equal to if not in excess of that of either of the other two systems.

But the gasoline motor is so convenient and so easy to slide into a mine and set to work that people are apt to get a motor and start it to run and keep it going just as long as it will turn a wheel. Naturally, with such treatment, wear, after a certain length of time, becomes rapid and breakage is ultimately inevitable. As the motors are becoming better understood, and the few parts which require attention are being discovered by the operators, the repair accounts are decreasing and the days during which the motors are out of service are becoming fewer.

The locomotives on every railroad are inspected by skilled men, at the end of every trip and necessary repairs are made immediately. If the gasoline motor happens to get an inspection once a week, it is fortunate; and I have known of cases where the locomotive was expected to run for five or six months without repair or adjustment of any kind. A day's work expended on the motors once a month will yield long returns in the way of low repair accounts and extreme reliability.

The Traction Qualities of a Gasoline Motor

These motors can pull as much coal as any locomotive of equal weight. We provide two speeds in each direction, which are approximately four and eight miles an hour, the low speed being used for starting the trip and for extremely heavy hauls on hard grades. Most of the work is done on high gear, under normal conditions, and owing to the flexibility of the engine, the speed of eight miles an hour is in many cases exceeded.

Another feature which makes the motor of considerable pulling capacity is the fact that it is quick and handy. In order to reverse the motor it is only necessary to move one lever about 12 in. Many times I have seen the motors run in one direction, when light or without a load, and then on the reverse lever being thrown over into the opposite side the motor would slide along the rails and the wheels turn rapidly in a direction opposite to that in which the motor was going.

Advantages of 4-Cylinder Opposed Horizontal Engines

We use a 4-cylinder, double-opposed, horizontal engine. This arrangement is not common, but we think we gain several advantages from this type of construction. In the first place, we are able to reduce materially the height of the motor without decreasing the size of the engine. In the second place, a double-opposed horizontal engine is better balanced than one of the vertical type. Third, we are able to oil the pistons with less danger of oil smoke than with the splash system used in automobiles, which has not proved well adapted to underground work. Fourth, and most essential, by using the horizontal opposed engine, we are able to get at all working parts by removal of the top without its being necessary to run the machine over a pit or to remove the entire engine from the frame.

Cooling by Direct Contact with Water

Next to the engine toward the front end of the machine is the fan. In our experiments with the original motors we tried to use the ordinary automobile type of

Note—Third part of an article read before the West Virginia Coal Mining Institute June 24, 1913, at Morgantown, W. Va., entitled "Gasoline Motor Haulage in Mines." The first part entitled "History of the Gasoline Mine Motor" was published July 19, Vol. IV, p. 80, the second entitled "Solutions of Two Gasoline Motor Problems" appeared July 26, Vol. IV, p. 118.

*Mechanical engineer, Geo. D. Whitcomb Co., Rochelle, Ill.

radiator, but we found that in order to be efficient, the elements of the radiator must be thin, and with the shaking and jarring of the motor and the constant danger of pieces of coal or slate striking various parts of the mechanism, it was utterly impossible to keep this radiator from leaking.

We therefore abandoned the radiator and put, on the two sides of our machine, a modified cooling tower. Water is pumped into the upper part of this chamber and drops down in the form of a spray. Through this water shower the air blows, forced by the fan which I have just mentioned. This gives us a cooler which cannot be overheated, and in which the parts are few and of great strength. The system is easy to take apart and clean. All passages are of fair size and contrast favorably with the restricted air channels in the automobile radiator. The device is bolted together so that a man with a monkey-wrench can take it apart, clean it, and put it together again without trouble, this construction contrasting to advantage with the automobile radiator which can be repaired only by an expert with the use of a soldering iron.

Reversing Gear

The bevel pinion engages with two bevel gears which it drives, of course, in opposite directions. These revolve loosely on a common shaft. A friction clutch is provided for each gear, and when either of these is in action, the shaft is rotated in the direction in which the bevel gear to which it is thus attached is revolving. In this manner by putting one friction clutch or the other in operation we obtain our forward or reverse motion. These friction clutches are of the disk type, the alternate disks being filled with holes in which are inserted small plugs of cork. These extend about $\frac{1}{32}$ in. beyond the surface of the large disk and are the only things which are in contact with the intervening steel plates.

Through the action of a force pump and spray heads these disks are constantly bathed with oil. We tried every known form of cone clutch and were unable to find any that would stand the extremely severe service expected, and not until we came to this cork-insert disk clutch did we find one which would stand the severe strains for any reasonable length of time. Under normal conditions the cork-insert disk clutch lasts a long time.

How the Speed Is Regulated

Keyed on to this same shaft are two spur pinions of different diameters which each engage with spur gears running loose on the secondary transmission shaft. These gears engage with that shaft through jaw clutches, these clutches being interlocked with the friction clutch so that they cannot be disengaged or engaged unless no power is being transmitted through the mechanism. In this way we get two speeds in each direction. From the secondary transmission shaft we chain down to the front axle with double chains and from the front axle we chain back again to the rear axle.

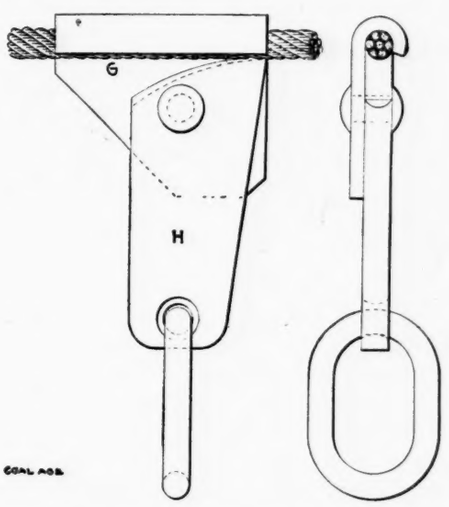
I do not know of a single part of the motor that has given more complete satisfaction from the very first than this chain drive. It seems to be durable and to give but little trouble, which could not be said of the *gear* drive to the front axle, which was used in some of the earlier motors. If the chains do happen to break, the cost of replacement is not excessive, as a full set for the 6-ton motor can be purchased for less than $40. Although some of the machines have been in use two or three years, we have had practically no sprockets to replace, those originally furnished still being in service.

We believe that the gasoline motor offers a means of haulage advantageous in so many ways and usable under so many conditions that its advent is almost revolutionary. It can be used, we believe, anywhere in a mine where there is a reasonable current of air. Its cost of installation is limited to the cost of the motor and is usually about one-third to one-half the cost of the installation of any other form of traction haulage.

Clutch for Inclines

Upon an incline of the Gerhard mine in the Saar district, Germany, is used a cable clutch which was designed by Josef Scherer, of Louisenthal. It is described in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1.

On the grades of 20 deg. and more, the cast-iron clutches with edge clamping arrangement did not give good service. They often broke under the heavy strains put upon them, letting the cars free and causing considerable damage. This led to the use of the clutch here described, which, because of its simplicity and strength, seems to be a good one.



Front and Side Views of Clutch

This rope clamp consists of the wrought-iron housing *G* and the lever *H*. Housing and lever are pivoted together by a strong rivet. On the lower end of the lever is a link for the attachment of the car.

After the lever has been turned backward by hand, the housing is hung on the cable. As the car is started its weight pulls the eccentric edge of the lever tight against the rope. When the car has reached the loading station at the foot of the incline, where its weight no longer has an effect, the clutch is automatically released and can be taken off without further ado. The price of the Scherer clutch, homemade, is about 45c. The rights in the invention are understood to be secured to the mine management.

Meeting of Southern Appalachian Coal Operators' Association

The annual meeting of the Southern Appalachian Coal Operators' Association was held in Knoxville, Tenn., July 25, with an excellent attendance. Several matters, such as markets, freight rates, car supply, etc., were discussed, with the best of good feeling and mutual benefit to all.

The members of this association are coöperating to make a success of the First-Aid Field Day, which is to be held in Knoxville, Sept. 20. It is said that teams from more mines have been entered for this contest and more prizes of greater value have been offered than for any field day ever held in this country.

The annual meeting was highly satisfactory and harmonious. The association is a compact organization which is doing valuable work for the field as a whole, thereby benefitting each individual operator. This is due probably in no small part to the officers, who are zealous men of keen foresight and large ideas.

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The Illinois Mining Institute

At the recent Mining Conference, held at Urbana, Ill., May 10, 1913, the following committee of five were appointed to arrange for a meeting to consider the organization of a mining institute in Illinois: J. D. Peters, Chicago-Carterville Coal Co., Carbondale; A. S. Allard, Bunsen Coal Co., Westville; H. H. Stoek, professor of mining engineering, University of Illinois, Urbana; Joseph Pope, district president U. M. W. A., Springfield, and Martin Bolt, chief clerk, State Mining Board, Springfield.

At the call of this committee, a meeting was held in the parlors of the St. Nicholas Hotel, Springfield, June 24th, and attended by a large number of mining men from all parts of the state. The meeting was called to order by Mr. Bolt, who was made temporary chairman. Oscar Cartlidge, manager, Mine Rescue Station, Springfield, was selected temporary secretary.

The following committee was appointed to prepare a plan of organization: John H. Ross, superintendent, Superior Coal Co., Gillespie; W. S. Burris, state mine inspector, Danville; and Geo. S. Barrowman, mine manager, Eldorado.

The committee prepared a plan for organization, which was presented at the afternoon meeting. Later a constitution was prepared and adopted. The following officers were then elected: President, John P. Reese, general superintendent, Superior Coal Co., Gillespie; first vice-president, Andrew Fletcher, superintendent, Taylorville; second vice-president, Robert Eadie, sub-district president, U. M. W. A., Cantrall; secretary-treasurer, Martin Bolt, chief clerk, State Mining Board, Springfield.

The following were chosen as an Executive Board: A. J. Moorshead, Madison Coal Corporation, St. Louis. Mo.; Gorden Buchanan, Chicago; Harry Fishwick, miner, Springfield; Thomas Moses, superintendent Bunsen Coal Co., Westville; H. H. Stoek, professor of mining engineering, University of Illinois, Urbana.

It was decided to hold the next meeting in November, at a time and place to be designated by the Executive Board. The outlook is bright for a successful meeting and a large membership. Short addresses were then made by the following gentlemen: David Ross, secretary, Bureau of Labor Statistics, Springfield; Walton Rutledge, mine inspector, Alton; Hector McAlester, mine inspector, Streator. The president, John T. Reese, made a very interesting talk, in connection with the work of organization, which closed the meeting.

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Alabama Coal Operators' Fifth Annual Outing

Special Correspondence

The Alabama Coal Operators' fifth annual outing to the coal mines of Alabama was held at Marvel, Ala., July 26. A special train left the Birmingham depot at 9 a.m., returning at 6:30 p.m. About 600 tickets were presented on the train and quite a number of guests drove into Marvel from the camps near by.

The following program was carried out:

10:45—11:15. Inspection of mine operations, town and commissary of the Roden Coal Co.

11:15—1:30. Morning session in Roden Co.'s auditorium.

1:30—2:30. Barbecue served in school hall.

2:30—4:30. Afternoon session in auditorium.

At both sessions in the auditorium moving pictures were sandwiched in between the addresses. The films were furnished by the Bureau of Mines and are the same as those shown in various parts of the country.

George F. Peters, president of the Climax Coal Co., of Maylene, presided at the meetings in the auditorium. The first paper of the session was presented by Frank Crockard, vice-president and general manager of the T. C. I. & R. R. Co. entitled, "What a Coal Operator Can Do to Provide for the Welfare of Employees and Their Families." The paper covered a wide range of topics, namely; ice and water supply, flies, mosquitoes, garbage, bath houses, food preparation and supply, education, stoves for school houses, sanitary drinking fountains, etc.

Great strides have been made in Alabama along these lines during the past two years, and as Mr. Crockard and his company have always taken the lead in this work, his address received close attention.

The second address of the morning session, "The Commissary; Its Indispensability and Purpose," was given by B. F. Roden, president of the Roden Coal Co.

There is much discussion in Alabama at the present time as to the desirability of the mine commissary; one side seeing in it only its possibilities as a "gouger" of helpless employees, while the other faction is equally positive that the improvident could not exist without it. Mr. Roden's paper was a temperate convincing exposition from the latter standpoint. One point was especially dwelt upon; namely, under the present garnishment laws of Alabama, the mine commissary is indispensable to many miners' families. Mr. Roden also emphasized the fact that if all companies would prohibit their operating officials from soliciting for the commissaries, the employees would soon get away from the idea that they are being coerced into trading there.

The last paper of the morning session was presented by L. M. Jones, of the United States Bureau of Mines, on

"Prevention of Haulageway Accidents." This paper was largely a summary of Miners' Circular No. 11, by the same author, issued by the United States Bureau of Mines. Three principal causes for such accidents were emphasized, namely: narrow roadways, lack of sufficient number of holes along haulageways for men to reach in case of danger, and trolley wires where workmen must travel.

One Way to Reduce Accidents

At the afternoon session the first paper was presented by C. H. Nesbitt, chief mine inspector of Alabama, on the subject of "Value of a Safety Inspector and Instruction for Each Coal Mine." As only one company in Alabama has so far deemed it necessary to employ safety inspectors, the paper was timely. Mr. Nesbitt referred to the fact that in 1912 over 50% of all fatal accidents in Alabama occurred at the working face, and "upon investigation it was found that a majority of these fatalities could have been avoided if proper instruction and supervision had been given." He also referred to the wonderful record made by the H. C. Frick Coke Co. in reducing accidents at its mines through the introduction of safety inspectors and instructors.

Discussion of Mr. Nesbitt's paper was given by E. Flyn, chief inspector of the T. C. I. & R. R. Co. Mr. Flyn made the rather startling statement that 80% of all accidents coming under his observation were attributable to carelessness, and most of them could have been avoided by proper supervision and instruction.

The last paper of the meeting was given by J. J. Rutledge, of the United States Bureau of Mines, on "Coal Mine Ventilation and the Removal of Gas." Most of the paper dealt with the subject from an elementary standpoint, but during the reading, several interesting experiments were mentioned. Mr. Rutledge stated that Mr. Williams, of the Bureau, has recently made some experiments in mines in the State of Illinois to determine the efficiency of stoppings, and the results were startling. Efficient fans were rendered almost useless by leaky stoppings. He also mentioned results obtained last winter by installing outside air courses to heat the air to about the temperature of the mine, by means of exhaust steam from the fans just before it entered the mine intake proper. He suggested that beneficial results could be obtained in mines where falls of roof were common by reversing the process in summer; that is, cooling the ingoing air to the temperature of the mine.

Printed copies of the papers presented were not distributed in advance, as had been done in previous years, and as a result discussions were almost lacking.

The size of the auditorium at Marvel (it is used as a church on Sunday, and often during the week picture shows are given), as well as the size and design of the public school, were commented on by all who saw them on this day for the first time. Surely the day of pleasureless mining camps in Alabama is passing.

In conclusion I wish to suggest that an excellent opportunity to illustrate the workings of sanitary measures was overlooked. During both sessions in the auditorium buckets of lemonade were passed through the hall and *all* of the members assembled were supplied through a *single* drinking cup. After the excellent description of sanitary drinking possibilities by Mr. Crockard the lone cup gave some of us the creeps.

Coal Washing in Kansas Not Profitable

By Barry Scobee*

The only coal washer in the mining district about Pittsburg, Kan., or in the whole state for that matter, is not a paying proposition from the standpoint of washed coal. It used to be, but the situation was changed by the development of the gas and oil fields which adjoin the coal district on the west.

The plant here referred to is owned by the Wear Coal Co., of Pittsburg, and is situated seven miles northwest of that town in the heart of what now is the newest district, just being opened up. In reality there are two washers, but they stand side by side and are owned by the same company.

The Only Coal Washery in Kansas

Washer No. 1 was put up in 1908, and No. 2 in 1910. At that time the oil and gas fields were at the height of their prosperity and output. This caused the demand for coal to decrease until the market was overloaded with mine-run stuff. What fuel was sold did not bring the price the operators thought it should, and as a consequence the Wear people decided to wash their coal, hoping the cleaned product would sell fairly well in competition with gas and oil.

The capacity of the first washer was 125 tons an hour. The coal sold so well that in 1910 washer No. 2 was put up, it being in capacity equal to the first. Both ran nearly all the time, and the demand for the cleaned slack often was greater than the supply. The washed coal found a market for itself in a district hitherto supplied only with dirty slack.

During the past 12 months, oil and gas in Kansas have lost much of their importance. Many authorities claim that the present wells cannot supply the demand. As a consequence, coal is again coming into its own in all this section of the country, and it is no longer necessary to wash the coal to get a good price for the product. Operators claim that more money can be made on unwashed coal, and as a result, the Wear company's washeries are idle most of the time. The coal is generally sold as it comes from the ground, except that most of it is screened.

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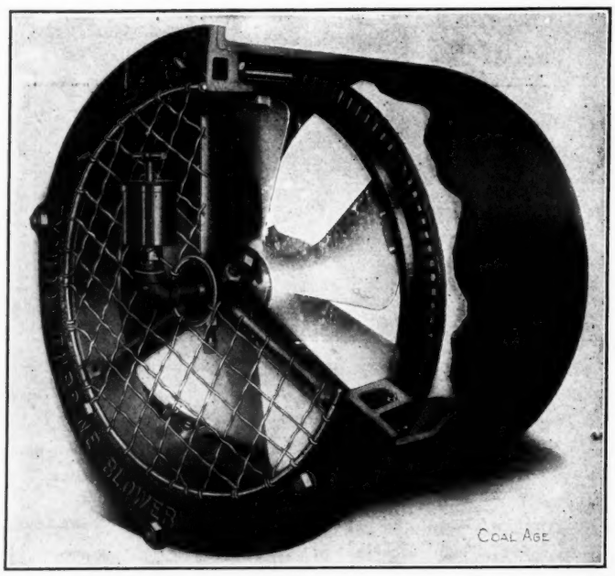
The Manchuria Ry. Co. operates five coal mines, which give employment to 7000 Chinese laborers, who work for 25c. per day. The output is 300 tons for each mine per 24 hours. Though the coal is bituminous, anthracite methods of mining are used, as the seam is too thick (125 ft.) to make bituminous methods practical.

*316 East Eighth St., Pittsburg, Kan.

POWER DEPARTMENT

Improvements in the Typhoon Turbine Blower

The Typhoon turbine blower made by the L. J. Wing Manufacturing Co., of New York, which is familiar to many colliery power-house men, has recently had some important improvements embodied in its construction. These consist mainly in largely increasing the strength of the blading of the turbine and in mounting the rotating parts upon suitable ball bearings which absorb both the radial and thrust stresses.



SHOWING IMPROVED TYPE OF TURBINE BLOWER

As is well known, this type of blower consists in mounting a single-stage turbine upon the rim of a highly efficient propeller type of fan. The construction of the turbine, in its improved form, is particularly interesting. The sherardized steel turbine blades are cast into a tough bronze ring upon their inner ends. The outer ends of the blades are bent over in an L-shape and are all welded together by means of an oxyacetylene flame. This method of construction renders the entire blade ring practically a unit and absolutely immune from the trouble which was formerly so frequently encountered in turbine construction, namely, the throwing of blades.

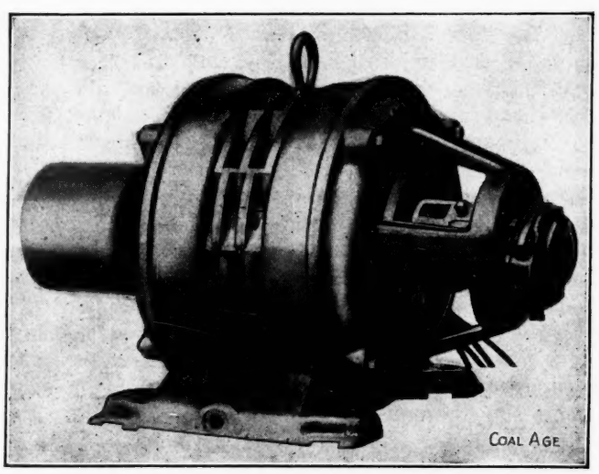
The rotating unit, consisting of the fan and its driving turbine, is mounted on two separate ball bearings placed a few inches apart. The bearing, as a whole, is entirely inclosed so that it is impossible for dust or dirt to get into it. The lubricant used is a soft mineral grease fed through a grease cup. The exhaust steam from the turbine mixes with the air supplied by the fan and has the effect of reducing considerably the amount of clinkers. This is an important consideration with many coals, as a high sulphur content or a fusible ash will ordinarily rapidly form clinkers of large size.

In the accompanying illustration, the outer casing of the machine has been cut away in order to show the interior parts. In ordinary practice, this casing is built into the setting walls of the boiler and thus takes up no additional floor space. The machine is at present manufactured in three standard sizes, namely 12, 16 and 20 in. The amount of air furnished varies, of course, with the size of the fan and its speed of rotation. The particular advantages gained by the employment of this blower are increased capacity or the utilization of fine or low-grade fuels, which would otherwise be unburnable. A draft pressure equivalent to 2½ in. of water may be easily obtained with one of these machines.

A New Westinghouse Single-Phase Motor

The Westinghouse Electric & Mfg. Co. has placed on the market a new line of single-phase motor made in capacities of from 2 to 10 hp. and suitable for the majority of constant-speed applications within their capacities.

This machine is of the repulsion-starting type and when up to speed, runs as an induction motor. For most applications, it can be connected directly to the line, but where low starting current is desired, a rheostat can be used.



NEW SINGLE-PHASE MOTOR

The frame is so designed that it combines great strength and radiating capacity with minimum weight and over-all dimensions. The laminations are riveted together under pressure and pressed-steel end plates are riveted to the unit thus formed. The foot, or base, is of pressed-steel plate securely riveted to the end plates. This use of pressed steel marks an important step forward in the design of large single-phase motors.

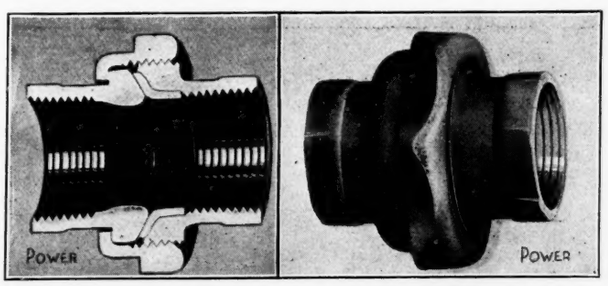
The bearings are large and dust-proof. The rotor coils are form-wound and arranged to permit excellent

ventilation. The commutator is of the radial type with undercut mica segments. The shaft can be pressed out of the rotor without disturbing the windings or commutator.

Each motor can be arranged for operation on either 110- or 220-volt circuits.

Mark Cold-Drawn Steel Union

This union is made seamless from cold-drawn flat-strip steel. Each union is treated by a sherardizing process, to render it immune from rust and corrosion, says *Power* of June 10, 1913. This process consists of heating the parts with zinc dust in a retort, which causes the zinc to penetrate a short distance into the metal and also leave an exterior coating. As the threads are cut before the treatment, they are protected against corrosion without altering their sharpness and fit.



SECTIONAL AND EXTERIOR VIEW OF THE MARK UNION

The Mark union, which is manufactured by the Mark Mfg. Co., Chicago, Ill., consists of three main parts, male and female ends, which are joined by coupling nuts. A brass ring *C* fits between the coupling ends as shown. The union is threaded to Briggs' standard for pipe threads and carries the same taper as the pipe. The expansion and contraction of the union under heat and cold is practically the same as that of the pipe.

Turbine Pumps with Electric Drives

Progress in the manufacture of high-grade material, and its use for high-speed rotary machines, has occasioned a continual increase of such speeds. For electric drive with alternating current and a frequency of 50 cycles per sec., a limit is reached at 3000 r.p.m. Such a speed is today often employed for motors driving centrifugal pumps, turbo-blowers and compressors. Indeed, for small rotary machines of this type such a speed is often insufficient, so that a steam turbine is frequently substituted.

The difficulties arising in the mechanical construction of high-speed motors have readily been overcome in the light of experience in the building of turbo-generators. Problems remained, it is true, in the design of rotor-collector rings and brushes, as well as short-circuit and brush-lifting devices, but today these obstacles have been surmounted. Alternating-current motors can be built and used which run at 3000 r.p.m. and deliver over 1000 hp., yet are as reliable as motors of 1500 r.p.m.

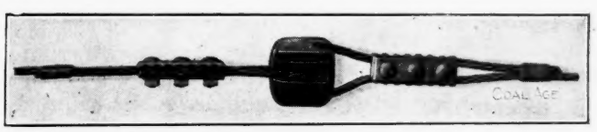
In driving these high-speed motors underground in mines containing firedamp, the ordinary safety precautions answer, so that since such machines are frequently mounted near the loading station, and, hence, are in the ingoing-air current, it suffices, if inclosure be necessary, to make only the collector rings gas proof.

Experience in general has taught that high-speed pumps, the efficiency of which is generally somewhat better than that of sets which run at the lower speed of 1450 r.p.m., but whose cost and space occupied are much less, can be employed advantageously only for pumping pure water. Sand, ashes, etc., as well as acid water, are decidedly destructive to pumps running at high water velocities. Therefore, it is best to use high-speed sets only for perfectly clean water, or where first cost is important, or when, as in the case of auxiliaries, for example, they are to be run only at intervals.

Finally, it may be asked whether the high potential motors may, under some circumstances, be successfully and reliably employed in wet places, as, for example, in sinking. Practice has shown that motors can hold their own even under such conditions, but it is advisable, in case they run intermittently, to maintain them constantly somewhat warm by keeping the field in a circuit at a suitably low voltage. For this purpose a small transformer may be provided, the low potential side of which has several contacts, so that the voltage may be readily adjusted to the heating requirements of the motor. If this machine should become so wet from dripping water that it is inadvisable to connect it with a low potential circuit, there can be placed around it a considerable number of incandescent lamps to dry out most of the dampness by their radiation.

A New Porcelain Strain Insulator

A new porcelain strain insulator of remarkably high strength, both mechanically and electrically, has just been placed on the market by the Westinghouse Electric & Mfg. Co., of East Pittsburgh, Penn. The manufacturer recommends these insulators for use on 1500-volt direct-current railway work and on 2200-volt transmission lines, a class of service for which porcelain insulators have been seldom used in the past.



STRAIN INSULATOR, SHOWING METHOD OF APPLICATION

It is claimed that the insulators will stand more strain than any cable used in line construction that will pass through the hole. They are of the interlinking type which makes it impossible for cables to separate even if the insulator should become shattered.

The glaze is of a dark-brown color, which does not attract the attention of those mischievously inclined. Sharp corners, which would be apt to chip have been avoided, and the shape of the grooves is such that the wires lie naturally in them. A large creepage distance is provided which makes it suitable for high voltages.

The smallest size of these insulators has a flashover voltage on rain test of over 13,000 volts, and the larger size, over 20,000 volts. The tensile strength of the larger size insulator is over 23,000 lb., and its dimensions are only 5x4½x4½ in.

Note—Translated by E. P. Buffet.

Transformers for Outdoor Service

SPECIAL CORRESPONDENCE

SYNOPSIS—The demand for small-capacity transformers for installation out of doors has greatly increased in the past few years. The principal difficulties encountered are the radiation of heat due to transformation losses within the windings and the introduction of the high-tension cables. This article tells how both of these obstacles are overcome.

Almost since the dawn of the electric era small lighting transformers of comparatively low potential have been installed out of doors and have satisfactorily withstood the service, their superior design and construction making them proof against the action of the elements. But, no effort was made at that time to develop a line of high-tension power transformers for outdoor service, owing to the demands for power then being confined to centers of population where the main stations and substations were located.

Recently, however, owing to the fact that it is often desirable to tap a high-tension line where the load is not sufficiently great to justify building a substation, high-tension transformers of all capacities and for any commercial voltage, have been designed for outdoor service.

An impetus has been given to this development by the phenomenal demand for electric power made by would-be consumers, located in the country along high-tension transmission lines, who realize the advantages of electricity for both power and light, but who do not require enough current to justify the expense of a substation.

The installation of the apparatus out of doors obviates the necessity of constructing new buildings or enlarging an existing station to provide room for the new equipment, and so may greatly reduce the cost of expansion. Yet, it is probable that very few persons outside of those connected with the design or sale of power transformers realize the rapid progress that has been made in the use of these instruments in outdoor service and the excellent records for reliability that those installed have made.

The familiar pole-type transformer, used on city distribution circuits, having a potential of from 2300 to 4000 volts, is comparatively simple to design for outdoor service, on account of the relatively low voltage. Standard transformers in capacities of from 1 to 100 kv.-a., are readily obtainable for this class of service, and all sizes embody practically the same construction with the exception of the tanks.

The core for these transformers, as built by the General Electric Co., is made up of four magnetic circuits of equal reluctance placed in multiple. Each circuit consists of four legs arranged to form a rectangle, one of these legs being built up of two widths of punchings, in such a manner as to form a tenon on the outside of the leg.

When the four circuits are assembled with these four legs together, the latter interlock to form a central leg upon which the winding is placed. The core, when viewed end-on, has the form of a cross. This construction brings the oil in contact with an unusually large part of the surface of the core and coils, so that undue heating of these parts is not possible under normal load or reasonable overloads.

As a result of the use of a thick mica shield between the primary and secondary windings, the highest degree of safety, which is the most important characteristic of a transformer, is obtained. This mica shield is designed to withstand a potential of from 15,000 to 20,000 volts and is practically indestructible when used on circuits having voltages around 2500.

An abundance of ducts and channels, through which the circulation of oil is maintained, results in uniform temperature throughout the transformer and eliminates the detrimental effects of unequal expansion in the coils with consequent rubbing and injury to the insulation.

All live terminals are located below the surface of the oil to prevent surges or lightning discharges from arcing over and short-circuiting the coils, or grounding to the tank.

The impedances of transformers of the same size vary but slightly, so, when such instruments are operated in multiple, each takes its proper share of the load.

The use of a special alloyed steel in the cores of these transformers has brought the core loss down to a minimum value with a consequent low loss when the transformer is slightly loaded and, as this steel is non-aging, there will be no increase in the core loss after an indefinite period of operation.

FIG. 1. A 10,000-VOLT, 5-KV.-A., TYPE H TRANSFORMER

Transformers below 25 kv.-a. capacity are placed in smooth cast-iron tanks. Above this size these receptacles are corrugated in order to obtain sufficient surface for radiation of the heat generated within the transformer due to the losses. The largest two sizes, if made of cast iron, would be too heavy and bulky for suspending on poles, so they are made of corrugated sheet steel. For operating on poles in the open and on the walls of buildings under the eaves, the tanks that contain these transformers must be weatherproof.

The cast-iron covers are, therefore, provided with overhanging edges and the joint between cover and tank is sealed by a gasket, effectively preventing the entrance of moisture and dust. The cover is securely fastened to the tank by two eyebolts, which also serve as a means of lifting the transformer. With eyebolts, the cover can readily be removed without the use of a wrench.

The primary bushings have thick walls and the portion which extends beyond the transformer is hemispherical in shape, so as to give a long creeping distance from the primary conductor to the frame. The rounded surface is not fractured or chipped, as it would be if the bushing had sharp corners.

Power transformers, 100 to 500 kv.-a., for distributing potentials, (2300-600), and all transformers above 6000 volts up to 500 kv.-a., employ a different type of con-

struction than the distributing transformers above described. Here, the straight two-legged core-type construction is employed. The core consists of two vertical legs connected together at the top and bottom by yokes, thus forming a rectangle.

Cylindrical coils and insulation cylinders are placed concentrically over the two vertical legs of the core, the high-voltage winding being outside those of the low-voltage, and separated therefrom by oil ducts and the above mentioned insulating cylinders.

Two Methods of Cooling

Power transformers for all voltages may be self-cooled or water-cooled. In self-cooled transformers, the heat arising from the losses in the instrument itself is dissipated into the surrounding air by providing a tank with sufficient external radiating surface to limit the temperature inside the transformer to a safe value.

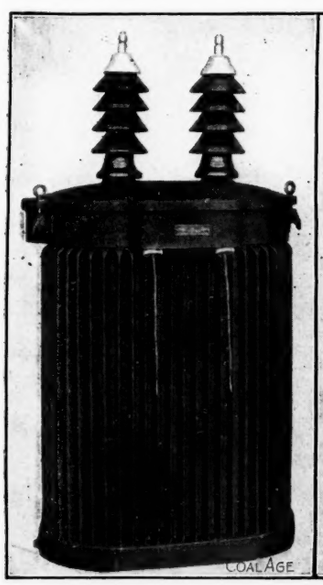


Fig. 2. A 33,000-Volt, 20-Kv.-a. Outdoor Transformer

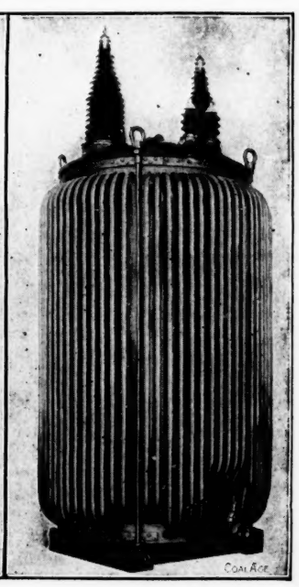


Fig. 3. A 110,000-Volt, 100-Kv.-a. Self-Cooled Outdoor Transformer

The tanks for these transformers are made from sheets of steel corrugated under great pressure and electrically welded together. A base and rim are cast directly to the corrugations, the joint between them being an actual weld. This forms a rigid one-piece tank which, when supplied with a suitable cover and gasket, is readily adapted for outdoor operation.

The main difficulty, however, in designing high-voltage transformers for outdoor use is encountered in bringing the leads out of the tank. In transformers below 17,500 volts, this is easily accomplished by leading them through porcelain bushings set in, or underneath, the rim around the top of the tank. For potentials above 17,500 volts this method is unsafe, so the leads are brought straight out through openings in the cover and protected from the weather by a porcelain covering, built up of several petticoats.

In water-cooled transformers, the heat generated by the losses in the transformer is artificially extracted from the oil by circulating cold water through a seamless coil of pipe placed in the upper part of the tank and submerged in the oil. The expensive corrugated tanks for radiating the heat are, therefore, unnecessary, so a plain steel tank is provided. Transformers in these tanks are suitable for outdoor operation when equipped with porcelain petticoat leads, brought out through metal bushing holders.

Transformers having a capacity greater than 500 kv.-a. are built of the shell type, i.e., the core surrounds the windings, which is in direct contrast to the core type, where the windings surround the core.

Self-cooled, shell type transformers are not built in capacities much above 3000 kv.-a., because of the large and expensive tank construction necessary to obtain sufficient radiating surface.

The extra radiating surface necessary for self-cooled transformers above 750 kv.-a. is obtained by compounding the corrugations, i.e., two plain corrugated sheets are welded together to form one large corrugation. This tank has about 65% more radiating surface than those of plain corrugated construction.

Another type of receptacle for large capacity, self-cooled transformers is known as the "tubular" or "pipe" tank. This consists of a boiler-plate tank having the ends of a double row of vertical steel tubes welded into it at the top and bottom, thus providing a natural circulation for the hot oil from the upper to the lower portion of the tank through these external pipes, where the heat is quickly dissipated. These tanks are very efficient.

The majority of transformers above 1000 or 1500 kv.-a. are water cooled. The tanks for these machines are made from heavy boiler plate, being round for single-phase transformers and elliptical for three-phase units. They are perfectly plain and smooth, having no corrugations or pipes, which are unecessary in this type of equipment.

All these various tanks are designed for outdoor use when furnished with a suitable cover, gasket and leads.

Three large water-cooled transformers, 2750-kv.-a. each, have recently been designed for outdoor operation on a 110,000-volt circuit. These are in successful operation at the present time. Some 1000-kv.-a. self-cooled transformers in tubular tanks are also operating satisfactorily outdoors on a 110,000-volt circuit.

A Heavy Illinois Producer

The following is the record for the new Staunton Coal Co.'s mine located at Livingston, Ill. (T. G. Hebenstreit, superintendent) for the year ended June 30, 1913:

The total production of the mine for the year was 848,721.1 tons, the actual working time being 212 days and 7 hr., making the average hoist per day 3986 tons. The total tonnage produced since October, 1904, amounts to 4,531,844.55 tons. During the month of June of the current year the mine worked only 9 days and produced 36,992.5 tons, making an average of 4110 tons per day. A breakdown in the hoisting engine, early in February, so restricted the production, that the average daily hoist for the first half of the month was only 3494 tons; had it not been for this accident, the production for the year would have averaged 4000 tons per day.

From data available at the present time, this is the record production for the state, and it is probable that no other mine will show such a tonnage. It is a noticeable fact that high-capacity mines are increasing in Illinois, while the smaller producers are on the decrease.

The Mine Fan

By Berton Braley

(Written expressly for "Coal Age.")

I am the lungs of the mine,
I am the guard against death;
The air in the workings grows stale
And the faces of miners grow pale
When I cease to take breath.
So I whirr and I whirr and I whirr
Till the chambers and entries below
Feel the dust-laden air all astir,
And the lamps, which were faint and ablur,
Shine out with a livelier glow,
Proving my worth as they shine,
I am the lungs of the mine.

I am the lungs of the mine,
I am its safety, its life,
In all of man's underground strife
With the heat and the damp and the dust,
I am his trust.
The uttermost depths of the mine,
The furthermost heading of all
Are under my thrall;
And the wind that goes sweeping so free
Through the gloom
Of each runway and room
Is from me.
So the damps and the gases they flee
On the wings of my breath;
And I shield men from death
And I give them the vigor to dare
The bowels and depths of the earth
For the coal that is there!

O my song is a deep-noted purr
As I whirr and I whirr,
Doing my task as I sing,
Keeping the workings astir
With the flood of pure air that I bring;
And the deadlier air I remove,
And thus do I prove
My value, my worth,
To the men who go under the earth
With the lights on their foreheads ashine,
For I am their life and the breath
That guards them from death,
I am the Lungs of the Mine!

❋

A New Deputy Mine Inspector

House Bill No. 206, introduced by Representative Spogen and passed by the last legislative assembly of the State of Montana, provides for the appointment of a deputy coal-mine inspector, to be under the supervision of the state coal-mine inspector and defines his duties, qualifications and salary. The bill has since been signed by the governor; but, as yet, no appointment has been made to fill the new position. Joseph B. McDermott is the chief mine inspector of Montana.

The bill is as follows:

Sec. 1. The governor, by and with the advice and consent of the Senate, shall appoint one deputy state coal-mine inspector. The said deputy state coal-mine inspector shall be selected from among the list of names certified to by the county examining board for mine foreman, fireboss or mine examiner. as having successfully passed the examination for mine foreman and been granted a certificate of competency as such by a county examining board, in Montana.

Sec. 2. He shall have like powers and duties as the state coal-mine inspector, but shall be under the supervision, and subject to the orders of, and report to the state coal-mine inspector any and all acts pertaining to the inspection of mines, investigation of accidents, scales, wash houses and other duties of the deputy state coal-mine inspector; and shall reside in and perform the duties of deputy state coal-mine inspector, in the districts assigned to him by the state coal-mine inspector. The deputy state coal-mine inspector shall receive a salary of twenty-one hundred ($2100) dollars per year, and all necessary traveling expenses. He shall file with the state treasurer, a bond in the sum of five thousand ($5000) dollars, approved by the governor, for the faithful performance of his duties.

Sec. 3. This act shall be in full force and effect from and after its passage and approval.

❋

Increased Coal Production in Colorado

Coal mining as an industry began in Colorado in 1864, when a production of 500 short tons was recorded. In 1876 the production reached, for the first time, a total exceeding 100,000 tons, and six years later, in 1882, according to the U. S. Geological Survey, it had attained the million-ton mark. Since that time, the increase has been almost uninterrupted. The production exceeded 3,000,000 tons in 1890; ten years later it had grown to over 5,000,000 tons, and in 1910 it exceeded 11,000,000 tons; but in 1912 it fell below the 11,000,000-ton mark.

❋

Erratum

The first sentence of the article upon "Coal- and Ash-Handling Equipment," appearing on page 76 of our issue of July 19, reads: "A coal-handling equipment supplied with a pivoted-bucket carrier system is, of course, designed only for a small plant." This should have read: "A coal-handling equipment consisting of a centrifugal discharge elevator handling both coal and ashes and a flight conveyor for the coal is, of course, designed only for small plants." As is well known, the pivoted-bucket carrier may be used in plants of almost any size.

COMING SOCIETY MEETINGS

International Geological Congress—The 12th session of this organization will meet, Aug. 7, at Toronto, Can. Address of Secretary, Victoria Memorial Museum, Ottawa, Can.

Woodward and Pettebone First-Aid Excursion — The united first-aid teams of the Woodward and Pettebone mines of the D. L. and W. R.R. Co. at Kingston, Penn., will run an excursion to Harveys Lake on Aug. 15.

American Institute of Mining Engineers—This institute holds its next annual meeting at Butte, Mont., on Aug. 18 to 21, inclusive. Bradley Stoughton, 29 W. 39th St., New York City, is secretary.

Kentucky Mining Institute First-Aid Meet—This meet will be held at Central City, Ky., on Labor Day, Sept. 1.

National Conservation Exposition—Miners' Field Day, to be held under the auspices of the Tennessee Mine Foremen's Association, with the coöperation of the Bureau of Mines and the American Red Cross, on Sept. 20, at Knoxville, Tenn.

American Mine Safety Association—The second meeting of this society will be held at the Bureau of Mines, Pittsburgh, Sept. 22-24. H. M. Wilson is chairman.

American Mining Congress—This society meets for its 16th annual session at Philadelphia, Oct. 20-24; the secretary is J. F. Callbreath, who has opened quarters in the Land Title Building.

Coal Mining Institute of America—Winter Session meets Dec. 4 and 5 at the Fort Pitt Hotel, Pittsburgh, Penn. C. L. Fay, secretary, Wilkes-Barre, Penn.

EDITORIALS

The New Anthracite Tax

When the Pennsylvania State legislature enacted the measure which places a tax on anthracite coal, the proceeds of which are to be used by the state and county governments, a new precedent was established. Only on one other occasion has a similar tax been exacted and this was for the purpose of raising funds during the Civil War.

It is said in justification of the act that the mining industry of Pennsylvania has greatly increased the governmental expenditures, and, further, that some provision is necessary to compensate for the loss which the state will sustain when the coal supplies are finally exhausted.

These points seem reasonable enough, but as a matter of fact they will not bear a close scrutiny. State expenditures have, no doubt, been heavily increased by the mining operations, but it is equally true that the companies are already heavily assessed, and it is safe to say that they are carrying their full share; in addition to this there are entire communities that are solely dependent upon the coal operators.

In the matter of providing for the ultimate exhaustion of the coal supplies it is difficult to see wherein this is being done. The accrued funds are to be allotted in equal proportions to the state and county authorities and will in some instances effect a reduction, if not a complete elimination of existing taxes. Were the funds devoted to the interests of the coal industry in the state, the act would be more commendable. If the mining operations have been a burden, these new funds should be applied directly to the relief of these particular burdens, as might be done by establishing a workman's compensation fund or allotting a portion to the mine inspectorate.

As to the constitutionality of the law, this remains to be tested. The National Government specifically requires that states refrain from placing any tax on products used in interstate commerce, and a large part of the hard coal mined in Pennsylvania is consumed in New York and neighboring states. Exemption from this provision, however, can be obtained by special permission and the fact that the coal is sold locally, as well as outside the state, may have some bearing on the subject. However, from any viewpoint, it appears that Pennsylvania is asking the consumers of anthracite in New York and elsewhere to pay a part of her current expenses, for any additional charge on the production of hard coal must come out of the consumer's pocket.

Generally speaking, a tax of any kind on coal is to be regarded with disfavor for the reason that it is an economically wrong principle. Fuel is a basic product upon which all industries are compelled to rely to a greater or less extent and any increase in its cost must eventually narrow its limits of application, and effect a restriction in development. The present tax is an oppressive and mercenary one at the best. In fact, it savors somewhat of the Jewish extortioner and exhibits a sordid parsimoniousness that is a discredit to the people of Pennsylvania.

The Van Swearingen Decision

It has long been thought that in accord with an extended series of decisions, it would some day be ruled that a coal or other like deed could not contain a clause giving the grantee the right to buy a part of the surface whenever he desired at a fixed price unless the deed contained a clause limiting the period during which the option might be exercised to 21 years after the death of the optioner or for some shorter period.

J. Q. Van Swearingen, judge of the Fayette County Court, has just made such a decision in the case of William Barton, Priscilla King and Harriet Coffman versus the Thaw Trust. The purchasers of the coal land in dispute were J. M. Thompson and J. K. Ewing. They resold it and with it also the right to purchase the surface, which formed part of the original deed to William Thaw, who, in turn, devised it to trustees for the use of his children, grandchildren and great-grandchildren and their survivors.

The judge has declared that this option to purchase is and has been from the beginning null and void and has ordered that this decision be entered on the docket against this clause in both the deeds mentioned.

We have no doubt that the decision will stand the test of appeal. Perpetual rights of the kind which the deed seeks to establish are against the public interest. It often becomes impossible to sell lands under such a restriction, and it certainly makes inadvisable the improvement of properties menaced by such a clause. The public interest is larger even than the need of the coal operator, and the latter will, we are sure, look at the matter from a broad national viewpoint.

The law seeks that there shall be no masterless land; as our country grows the best sites must not be made worthless by a divided, unsettled ownership. The right to buy must not perpetually exist to cloud title; it must not be legalized without limitations lest it serve as an opportunity to levy blackmail under legal sanction.

Judge Van Swearingen quoted the case of Dewey versus the Great Lakes Coal Co.; we do not like that decision and hope eventually it may be proved to be bad law. It happened that substantial justice was done when the court decided that Dewey could not prevent the coal company from using land without payment for the development of its coal mines in accordance with the wording of the deed which conveyed the coal with general mining rights and the right to use the surface for mining purposes.

To the layman the Great Lakes Coal Co. was wholly within its moral rights, as it certainly took up the land within reasonable time and before any marked increment of value had taken place, but the interpretation of the law even if correct was, we think, much to be regretted. The judge said that as there was no consideration to be paid when the land was used by the corporation, the right to the land was not contingent but was immediately

vested in the coal company. The taking of the land was not a remote possibility, it was practically an accomplished fact from a legal standpoint from the moment the purchase deed was signed.

We consider that this matter was open to debate and we believe that the decision, even if perfect from the standpoint of established equity, is not in accord with public advantage. An option to use land without payment for a long period of years is no more sacred from the point of view of public advantage than the option to buy it at a price, regarded as fair at the time of contract. We cannot feel that there is not the remoteness or contingency in such a case as will make it come under the perpetuity doctrine. It is equally uncertain in both cases what part of the land will be taken for mining and when that portion will be taken. As for the consideration that the use to which reference has been made is for a period of years only and the purchase is not so limited, that is rendered of no importance by the fact that the rule is directed to remove the remoteness, not of the "cesser" or termination of the alienation of the land, but its commencement.

It seems to us that some time or other the Dewey precedent will be reversed or will be corrected by statute law. In fact, we believe that not only the right to buy, but the right to use and even the right to spoil might be placed under the rule in equity relating to perpetuities with decisions reaching back to 1616. Surely the threat to injure property should not perdure from century to century, making the land threatened worthless meanwhile. The vendor in most cases gets enough at the time of sale to cover every form of surface disturbance often many times over, and we have little interest in him and his querulous complaints, but the public should not be cumbered by the uncertain ownership of land.

The laws which entailed the estates of the wealthy in England have been unfortunate. They have prevented the selling of land and have hampered its use. How much more unfortunate will our laws be if they prevent the use of a large part of the lands of the community for building purposes. Many a nation has suffered from laws which were not indeed inequitable between *the contracting* parties but which were highly unjust to the nation as a whole, a hidden canker in the economy of the people.

The Second-Class, Mine Foreman's Certificate

In another column of this issue we print an interesting discussion of the handicap that attaches to the term "second-class," as applied to mine foreman's certificates. Our correspondent draws attention to the custom practiced in several mining states, of classifying the mines in the state as gaseous or nongaseous. The examination of candidates for mine foreman's certificate, in each of these classes, is made to conform to the particular conditions in those mines. The certificates granted to successful candidates, in respect to gaseous mines, are styled "first-class mine foreman's certificates"; while those relating to nongaseous mines are styled "second-class mine foreman's certificates."

While the terms *first-class and second-class* are intended to refer only to the classification of the mine, it is true, as is pointed out by our correspondent, that the term is too often taken as applying to the holder of the certificate; and he is, as a consequence, regarded as a "second-class" man. We heartily agree with our correspondent in the suggestion that this practice should be altered; and if there is to be any division styled "first-class" and "second-class, these terms should be used in reference to the capability of the candidate as determined by examination. The classification of the certificate as referring to gaseous and nongaseous mines should be designated by these terms only.

We hope that this matter will receive the attention that it deserves at the hands of state examining boards and state departments. It is not the first time that attention has been called to the same question by those who suffer from the error.

A Contract Violation

An all but universal trait of human character is the desire to see the under dog win. There exists, however, an equally potent sentiment which demands a fair fight. Throughout the long and bitter industrial struggle which has been waged in the Kanawha coal fields in West Virginia, the mine worker has been almost universally regarded as the under dog, and few indeed have been the tongues or pens bold enough to resist public sentiment and champion the operators or their cause.

When the officers of the United Mine Workers recently signed a contract with two companies, operating upon Paint Creek, "for and in consideration of" the "check-off," whereby the union is assured of a certain revenue each payday, to all appearances they knowingly and deliberately violated an already existing agreement with other operators in the same region. Furthermore, this existing contract had been concluded with those, who, if not in actual sympathy with the organization and its motives, were at least willing to take equal chances for returns upon their investment with others in the same field when assured in all candor and upon the written agreement of the union that it would "enter into no contract with any other operator in the Kanawha district carrying different terms or conditions to those provided for herein."

However lightly the leaders of the United Mine Workers may regard the integrity of the organization they represent, they will sooner or later be made to realize that the union is primarily a commercial enterprise. From the business standpoint, the first duty of every seller of any commodity, be that commodity steel, oil, coal, labor or whatnot, is to fulfil all business obligations to the satisfaction of the customer, to give him the full value of 100c. for every dollar which he expends—otherwise no customer will long continue to make contracts or spend dollars.

Much interest now attaches to the question of concrete overcasts. In this connection it is well to remember that the cost of such overcasts can be greatly reduced by the use of reinforcement. Well screened tough coal can be economically used in place of crushed stone in places where the roof pressure or the danger from fire is not great. If, however, the coal is not well screened, too much fuel dust is apt to be present, thus necessitating the use of a large amount of cement, without any corresponding improvement in the strength of the concrete.

Relation between Railroad and Shipper

By A. L. H. Street

SYNOPSIS—A railroad need not meet the peakload requirements in transportation. Before making a demand for shipment, the shipper would do well to make tender of freight charges. A carrier cannot be compelled to accept freight from a private siding unless it has so contracted. Damages may be punitive if malice can be proved.

As a general rule, a railroad company is bound to furnish reasonable and ordinary facilities for transportation, but need not provide in advance for extraordinary occasions or an unusual influx of freight (18 Illinois Supreme Court Reports 488). Or, as decided by the Nebraska Supreme Court, the company must furnish cars necessary to transport freight offered it, but when it has provided itself with the equipment necessary for that purpose in the usual course of business, despite the fact that at certain seasons more cars are needed than at others, it has fulfilled its duty, and will not be required to meet unusual demands for cars (99 Northwestern Reporter 309).

In an Arkansas case, growing out of a carrier's refusal to furnish cars for coal shipments, it was held by the Supreme Court of that state that while a railway company must provide cars for normal conditions of its traffic, unless it has reason to foresee other conditions, it is not required, during a temporary abnormal situation, to furnish a car for every one that is sent off its line in fulfillment of previously made contracts, though cars wholly beyond its control are the same as if not owned by it (120 Southwestern Reporter 380).

The Kentucky Court of Appeals has excused a railroad company's refusal to furnish cars to move coal for a shipper in a case where a strike at the mines compelled it to use its coal-hauling equipment to obtain a fuel supply for its locomotives, etc., from more distant fields (35 Southwestern Reporter 626). But it has been decided that a railway company's action in reducing the wages of its employees, causing a strike which suspended operation of trains, did not make it liable for damages resulting from its refusal to receive a shipment. (65 Indiana Supreme Court Reports 188).

Prepayment and Shipping Rights

The fact that a shipper owes a carrier charges for previous shipments does not justify the latter in refusing to receive further consignments (4 Kentucky Law Reporter 730). But the carrier is entitled to demand prepayment of charges, though failure to tender such prepayment does not excuse refusal to receive freight for transportation unless prepayment is demanded (54 Illinois Supreme Court Reports 88). The Vermont Supreme Court has held, however, that refusal of a carrier to transport coal did not, in the absence of actual tender of freight charges, amount to a waiver of such tender, so as to subject the carrier to liability for loss of business on account of such refusal (30 Atlantic Reporter 41). It thus appears that, in order to preserve a right of action for a carrier's refusal to afford shipping facilities, it is safer to tender prepayment of the freight charges.

There is a federal-court decision to the effect that a railroad company was not entitled to enforce, as a condition precedent to the receipt of a coal shipment from canal boats at the company's dock, a requirement that the master of the boats employ shovelers designated by the company, at a price fixed by it (Federal Case No. 14,010).

Law Relating to Sidetracks

A carrier cannot be compelled to receive freight on a private switch track, unless it has contracted to do so (134 Federal Reporter 64). When it has designated a siding as the place at which it will receive coal for transportation, not in an unreasonable place, a railway company cannot be compelled by the shipper to receive shipments at another siding where merchandise other than coal is received, though the latter place may be more easily accessible to the shipper (129 Federal Reporter 753). But under the statute in force in West Virginia requiring carriers to make reasonable provisions to carry coal and coke, a railway company may be required to construct a sidetrack and switch wherever the same may be necessary (64 Southeastern Reporter 630). A railroad company having a newly constructed line through a locality underlaid with coal, by permitting owners of mines to load cars from wagons on its sidetracks at two small stations for several months, did not give them a vested right to continue that practice, nor forfeit the right to change the regulation when a change became reasonably necessary to faciliate the operation of trains and the handling of other freight (125 Federal Reporter 445).

Damages, Punitive and Actual

As a general rule, the damages recoverable against a railway company for refusing to receive a shipment are measured by the difference between the value of the property offered for shipment at the place where tendered for transportation and at the proposed destination, less freight charges (22 Hun 533 [New York]). Punitive, as well as actual, damages may be assessed if it is established by the complaining shipper that the refusal was induced by ill-will or willful disregard of his rights (7 Southeastern Reporter 493). In Kentucky, the Court of Appeals has held that where a railroad company failed to furnish the owners of a mine with cars, they could recover the difference between the value of the coal offered for carriage at the mines and at the proposed destination (13 Kentucky Law Reporter 832).

But a dealer cannot recover damages for a carrier's refusal to transport coal, arising from his contract to buy the coal, if the quantity which he could require the seller to deliver was optional with the latter, and it does not appear that the dealer made any contracts for resale that caused him loss; but as to another agreement binding the seller to deliver a specified quantity, the dealer can recover the enhanced cost of delivering the coal under contracts for resale made on the strength of that agreement (135 Southwestern Reporter 768). An Illinois statute making a railway company liable in treble damages for refusal to furnish cars to carry freight has been held not to bind a company to furnish cars for coal not yet mined (19 Illinois Appellate Court Reports 141).

SOCIOLOGICAL DEPARTMENT

"The First-Aid Muddle" Answered

By W. S. Rountree, M. D.*

In the May 17 issue, I note in the Sociological Department an article headed "The First-Aid Muddle," signed "By a Physician," which is an unjust and unwarranted attack upon the American Mine Safety Association, written by a person ignorant of the facts or else intentionally misrepresenting them. Ordinarily an anonymous article deserves no recognition, but since Coal Age has seen fit to publish the above mentioned article, as a member of the Executive Committee of the American Mine Safety Association, I am writing a brief statement of what is being done by that body to work out a uniform course in first aid to the injured.

All workers in the first-aid movement fully realize the importance and necessity of uniform standards and of forming a central organization, and it was with this end in view that the National Mine Rescue and First-Aid Meeting was held in Pitsburgh, 1911, and a conference on first-aid called by the U. S. Bureau of Mines at Pittsburgh on Sept. 25, 1912.

All great movements must have a beginning and the outcome of these meetings was the organizing of the American Mine Safety Association, the primary objects of which are not only to standardize first aid, but mine-safety and rescue methods also, and to create a central organization for carrying on the work.

The standardization of first-aid rules was referred by the conference to a committee of about two dozen surgeons, of which Dr. A. F. Knoefel is chairman. It is expected that this body will report back at the next annual meeting to the full committee of surgeons composing the association.

Both Lay and Medical Men in the Executive Council

The Executive Committee of the American Mine Safety Association which is charged with the duty of perfecting the rules for standardization as well as with the forming of a central organization is composed of the following members:

H. M. Wilson, chairman; U. S. Bureau of Mines, Pittsburgh, Penn.; John P. Reese, vice-chairman, Superior Coal Co., Gillespie, Ill.; Dr. W. S. Rountree, Tennessee Coal, Iron & Ry. Co., Birmingham, Ala.; Dr. A. F. Knoefel, Vandalia Coal Co., Terre Haute, Ind.; Dr. G. H. Halberstadt, Philadelphia & Reading Coal & Iron Co., Pottsville, Penn.; Austin King, Frick Coal & Coke Co., Scottdale, Penn.; G. H. Hawes, Oliver Iron Mining Co., Duluth, Minn.; E. H. Weitzel, Colorado Fuel & Iron Co., Pueblo, Colo.; R. A. Phillips, Delaware, Lackawanna & Western R.R. Co., Coal Department, Scranton, Penn.; C. S. Stevenson, secretary, Bureau of Mines, Pittsburgh, Penn.

Looking over the above list, it will be seen that practical mining men, as well as surgeons, were placed on this committee. The purpose of this was to obtain the best results on all the problems to be submitted and it will be readily conceded after reading the considerations here following that in appointing such a widely representative body of men, a wise decision was made insofar as first aid is concerned. As a rule, the work of the surgeon is done on the outside of the mines, while first-aid men do their work underground. Therefore, engineers and miners are those best prepared to give practical information regarding accidents and they greatly assist the surgeon in making suggestions as to the manner in which to conduct first-aid work within the mines. It is expected that when the executive and special committees meet next September that they will go over the report jointly and make suggestions, so that the first-aid work can be standardized from all viewpoints.

The noted surgeons of this country always specialize in some lines of work; so far few of them, outside the army and navy, have made a special study of first aid; in fact, this movement is still in its infancy and has developed no special leader of great fame. A man must work his way slowly to the heights.

Sylvester Versus Schaefer

The schedule of discounts is framed only temporarily, and experience will develop what changes are needed. Both the Sylvester and Schaefer methods of artificial respiration have been adopted for the reason that when one is impracticable, the other can replace it. For instance, when injuries to the arms or back are involved the Schaefer method is used—otherwise the Sylvester method may be employed; hence both methods must be taught.

In all surgery, aseptic treatment is the first and foremost necessity, standing preëminently ahead of all other needs, for without it there is no certainty of success in any treatment, especially when infection already exists. In such cases it is more vital than ever, for to add infection to infection would be a double crime.

It is beyond question that first aid should be standardized but, that it should be done wholly by a body of scientific medical men is not feasible for the reason that first aid is a necessity more practical than scientific, the scientific requirements having to be conformed to the practical surroundings; therefore, surgeons, even the most noted, must base all first-aid methods in mines, upon surrounding underground conditions, which are to be learned through the suggestions and information furnished by engineers and practical miners. Thus it is wise to include such men in the Executive Committee.

No jealousy and personal animosity should exist in the work of establishing a central organization and in adopting standard rules to be used in the mines, furnaces, factories and in fact all walks of life. First aid is a work of humanity, and not of personal grievances and should not be hampered by professional ethics and scientific methods. It is too big an undertaking to be held in check by individual narrowness. It is a work where surgeons, mine owners, engineers and miners should get together for the sake of safety and protection of life.

*Member of the Executive Committee, American Mine Safety Association. Physician, Tennessee Coal, Iron & Ry. Co., Wylam Hospital, Birmingham, Ala.

New Frick Developments

The Union Supply Co., having stores at all the H. C. Frick Coke Co.'s plants, has recently contracted with the Nicola Building Co., of Pittsburgh, Penn., for the erection of two new store buildings, to be erected at Leith and at Phillips, to take the place of the one recently destroyed by fire.

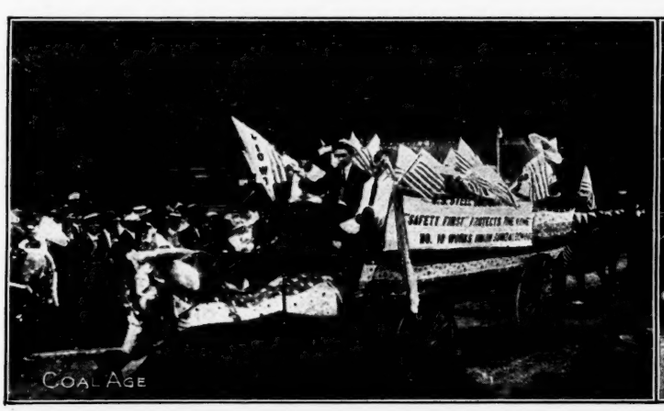
Under directions from Superintendent John Lynch, of Uniontown, Penn., experiments have been conducted for some time past with soda-water fountains and ice-cream parlors. Superintendent Lynch states that they have been a decided success, a great accommodation to the people at the plants, giving them the same advantages possessed by the residents in the larger towns surrounding. The new stores will both be fitted up with these departments. A feature of the equipment in these stores will be the installation of what is designed as an absolutely flyproof meat department, with refrigerating counters, several of which are now in use at various stores.

A new swimming pool, illuminated at night, has been installed at Footedale, another operation of the same company. Another is under construction or already completed at the Redstone plant.

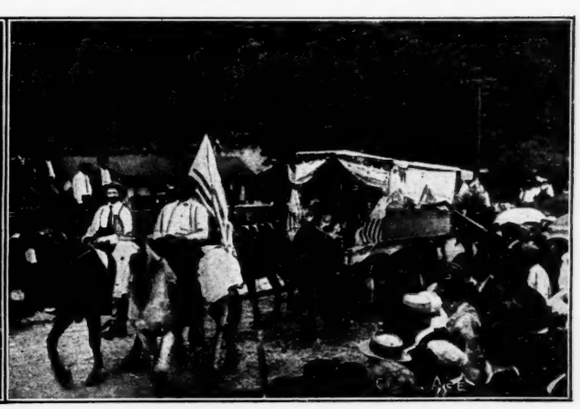
How the U. S. Coal & Coke Co. Kept the Fourth

PRIZE-WINNING FLOAT, NO. 2 WORKS

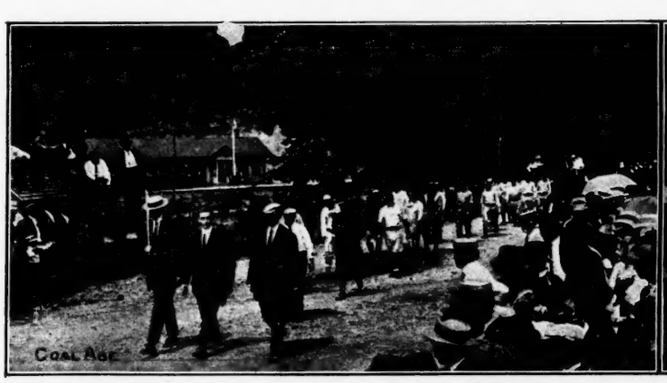
EMPLOYEES AT STORE AT NO. 4



FLOAT FROM MINE NO. 10



A WAGON LOAD OF SCHOOL CHILDREN



THE GARY BALL TEAMS IN PROCESSION

PARADE OF EMPLOYEES OF MINE NO. 12

DISCUSSION BY READERS

The Second-Class, Mine-Foreman's Certificate

All states that grant certificates of competency to candidates for the position of mine foreman invariably require a certain number of years' experience in a gaseous mine, as a prerequisite to the granting of a first-class certificate. Lacking this experience, though frequently excelling in other particulars, the applicant can only obtain a second-class certificate.

My purpose in writing is to draw attention to what may be called the psychological effect of the word "second class," as applied to a mine-foreman's certificate. While it is quite generally understood that the holder of a second-class certificate is eligible to the position of mine foreman in any mine not generating explosive gas, the general effect of the term on most mine managers is distinctly observable.

In many of the more important coal fields of the United States, little or no explosive gas is generated, yet these fields produce good men, who are well versed in both the theory and practice of mining and who are competent to fill the more lucrative and responsible position of mine foreman. I believe I am safe in the assertion that, as a rule, the man holding the second-class certificate is better equipped for the position of mine foreman in a nongaseous mine than is the man holding a first-class certificate; and yet the holder of a first-class certificate is often given the preference in respect to a position in a nongaseous mine.

The fact is not generally taken into consideration by the manager, that the holder of the second-class certificate is better acquainted with the conditions in a nongaseous mine than is the holder of a first-class certificate; because the former has obtained all of his experience in mines of that particular type. He knows or should know the methods and practices best adapted to the safe and economical extraction of the coal, in such mines, better than the holder of a first-class certificate, who has obtained his experience, perhaps, in the anthracite mines of Pennsylvania or in the large gaseous mines of the bituminous region.

Since the present method of granting certificates grades all applicants receiving the required percentage mark in the examination, on an equal footing, I want to suggest that it would, no doubt, prove beneficial to grant "first-class gaseous" and "first-class nongaseous" certificates to applicants receiving over 90 per cent. in both classes, in examination. Applicants receiving less than 90 and above, say 75 per cent., could then be granted "second-class gaseous" and "second-class nongaseous" certificates. This would relieve many good men of the handicap of being known as second-class men, or as holding second-class certificates when their capabilities are fully equal to those who hold first-class certificates.

X.

Crumpler, W. Va.

Safety Lamps and the Eyesight

I have been interested in the recent discussion of this question and particularly in the remarks of Mine Inspector W. L. Morgan, COAL AGE, July 12, p. 63. Mr. Morgan refers to the examination of the eyes of firebosses at the Globe Colliery, Wales, England. As I worked in some of the worst gaseous mines in South Wales and Bristol, I am well acquainted with the conditions that existed in the Globe Colliery and am convinced that the eyesight of the miners in that colliery was injured more by the mine gases and firedamp to which they were exposed than by the safety lamps they used.

I want to suggest that a fairer test to determine if the constant use of the safety lamp has any tendency to injure the eyesight would be to select, say 100 miners of 50 years of age, from a gaseous mine; and compare their average eyesight with that of the same number of miners taken from mines entirely free from gas. I think that such a test would prove that the safety lamp produced no bad effect on the eyes when the lamp is properly used.

Much depends on the way a fireboss carries his lamp. This is the first thing to be learned; and, until then, no man has a right to be a fireboss. He should not hold his lamp in such a way as to expose his eyes to the heat and gases from the lamp. In my opinion, the experience of men who have used the safety lamp continuously for a number of years, without receiving any appreciable injury to the eyesight, proves more than the limited knowledge to be gained by an examination, in a single district, by oculists and physicians.

FIREBOSS.

Brazil, Ind.

Advantage of Compressive Ventilation

I was glad to notice the reference made by Robert McCune, to the advantage of compressive ventilation in mines, in his article, "The Air Current and Mine Explosions," COAL AGE, July 5, p. 25. In reciting his experience and observations in regard to the effect of the exhaust and compressive systems of mine ventilation, to increase or decrease the explosive conditions in a mine, Mr. McCune has drawn attention to an important factor, both in respect to preventing mine explosions and keeping mines in a sanitary condition.

In the compressive system of ventilation, the mine is ventilated under a pressure greater than that of the atmosphere; while, in the exhaustive system of ventilation, the mine is ventilated under a pressure less than that of the atmosphere. To make this matter more clear, assume the atmospheric pressure (sea level) is 14.7 lb. per sq.in. or 2116.8 lb. per sq.ft. If the mine water-gage taken in the fan drift is 2 in., the ventilating pressure is 2x5.2 = 10.4 lb. per sq.ft., at this point. Then, assuming the efficiency of the fan is 60 per cent., the total pressure producing ventilation or circulating the

air through the fan and the mine is 10.4 ÷ 0.60 = 17.3 lb. per sq. ft.

When the fan is blowing the air through the mine (compressive system) the total pressure on the intake air is 2116.8 + 17.3 = 2134.1 lb. per sq.ft. On the other hand, when the fan is exhausting the air from the mine, the pressure on the intake is the atmospheric pressure (2116.8 lb. per sq. ft.) and the pressure on the air in the fan drift (return airway) is 2116.8 — 17.3 = 2099.5 lb. per sq.ft. This shows a difference in the mine pressure, in the two cases, of 34.6 lb. per sq.ft., in favor of the compressive system. In my judgment, this difference in pressure is exerted to keep back much of the poisonous and inflammable gases that would otherwise enter the mine, and is one point in favor of the compressive system of ventilation.

REES H. BEDDOW,
State Mine Inspector.

Gallup, N. Mex.

Shooting Mine Timber

I was interested in the article by Miner, COAL AGE, June 28, p. 1007, relating to the shooting of mine timber. I want to say that a better method is always to *draw* the timber, using for this purpose the Sylvester or other similar machine. I have had this machine for some time and consider it useful in many ways. No mine where posts are to be drawn is complete without it as a part of the equipment. The pulling strength of the machine is five tons; and unless proper precautions are taken, it will often break the chain.

Where there is a great weight on the post, or the latter is roof-bound, it is often necessary to weaken the post before attempting to draw the same. This must be done with caution, but can generally be accomplished by carefully splitting some from the cap-piece with a pick. Where the roof is loose or treacherous, however, this should not be attempted.

A good scheme in drawing a post is to so arrange the hook that the pull of the chain will be exerted on the side of the post, in such a manner as to turn it around when drawing. This will help very much to loosen the post from its hold in the roof. With the hook in front of the post, the chain exerts only a dead pull, and if the roof is heavy on the timber, it will often be difficult to start the post in this way.

It often happens that a post is nearly buried in the waste. In that case, it will be necessary, after loosening the head of the post, to slip the chain down and take another hold, in order to draw it out from the gob. If fastened at the middle the chain may break the post.

CHARLES WAINE.

Marianna, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MULTIPLICATION

Multiplication is only a particular form of addition in which the numbers added together are all equal. Thus, instead of adding together five sevens, as follows:

$$7 + 7 + 7 + 7 + 7 = 35$$

since these figures are all the same, the operation is expressed more simply by the methods of multiplication. For example, in the above operation, seven is taken five times, which can be expressed thus,

$$5 \times 7 = 35$$

and is read

5 times 7 equals 35.

The same result is obtained by taking five, seven times. For example, by addition,

$$5 + 5 + 5 + 5 + 5 + 5 + 5 = 35$$

or, by multiplication,

$$7 \times 5 = 35.$$

It is important to observe that in adding or multiplying numbers, the order of the numbers is not important. The sign of multiplication is an oblique cross (×) and is read "times." It is written between numbers that are to be multiplied together. It is customary to memorize the multiplication of numbers up to 10; and these are known as the "multiplication tables." Instead of these tables we give below a simple chart, which shows at a glance the result of multiplying together any figure in the top row by any figure in the vertical column on the left. The product is found at the intersection of the corresponding column and row.

MULTIPLICATION CHART

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

For example, to multiply 7 by 5, find the figure 7, in the top row, above the line, and follow down that column to the row corresponding to the figure 5, in the column on the extreme left. The number found (35) is the desired result.

The Coal Age Pocket Book

Multiplication of Larger Numbers—When numbers of two or more figures are to be multiplied, the one by the other, the second, called the "multiplier," is written under the first, called the "multiplicand," so that units stand under units, tens under tens, etc. Then proceed according to the following:

Rule—Beginning on the right, multiply each figure of the multiplicand by the units figure of the multiplier, in turn, and write the units figure of the resulting number under the figure multiplied. In each case, the tens figure, if any, must be added in as units, in the next following multiplication, till the last figure has been multiplied, when it is set down in its place as the final figure of that multiplication, which is called a "partial product."

In the same manner, now, multiply each figure of the multiplicand, again, by the second figure of the multiplier, in turn. But, in this case, the units figure of each resulting number must be written one place to the left of the figure multiplied, instead of under that figure. The tens figure, as before, is added in as units, in the next following multiplication, except the last when it is written as the final figure of that multiplication.

In the same manner, multiply, in turn, each figure of the multiplicand by each figure of the multiplier; but each time a new multiplier is taken the units figure must be written another place further to the left, the tens figure, if any, being added in as units, in the next following multiplication till the last.

When all the figures of the multiplier have been used the several results must be added together, as they stand, beginning on the right and following the rule for addition.

One or two examples will make the process clear.

38,509 Multiplicand	1,603,950 Multiplicand
175 Multiplier	7 098 Multiplier
192 545	12 831 600
2 695 63	144 355 50
3 850 9	11 227 650
6,739,075 Product	11,384,837,100 Product

As indicated here, the multiplicand is written above the multiplier, and the final result is called the "product." When a cipher occurs in the multiplicand there would be a corresponding cipher in each of the partial products, except for the tens figure that is carried forward from the multiplication of the preceding figure.

As appears in the example on the right above, when a cipher occurs in the multiplier there is no corresponding partial product and the next partial product is set forward two places to the left instead of one. Always the first figure of each partial product stands under the corresponding figure of the multiplier. The proof of multiplication is division. The product divided by either the multiplier or multiplicand gives the other.

INQUIRIES OF GENERAL INTEREST

The Mine Foreman's Certificate

Kindly inform me if a Red-Cross certificate will be of any assistance to a candidate, in the examination for certificate of competency to act as mine foreman.

FIREBOSS.

Gallitzin, Penn.

The examination for a Red-Cross certificate is held under the auspices of the First-Aid Department of the National Red Cross Society. This certificate would not be accepted by an examining board appointed by the state for the examination of candidates for certificates of competency to act as mine foreman. Every mine foreman's examining board is held responsible for its own work and is not authorized to accept certificates issued by another board.

Weight of Broken Coal

Kindly give the weight per cubic foot of broken coal in the New River district of West Virginia.

INQUIRER.

Beckley, W. Va.

The average specific gravity of the New River coal may be taken as, say 1.3, which would make the coal weigh in the solid $1.3 \times 62.5 = 81.25$ lb. per cu.ft. When broken into the common market sizes for domestic use (stove or chestnut) the broken material increases, in bulk, from 75 to 90 per cent.; or, say, 1 cu.ft. of solid coal will occupy when broken to market size about 1.8 cu.ft. of space; and the weight of the broken coal would then be, for New River coal $81.25 \div 1.8 = 45.14$ lb. per cu.ft. This would make a ton occupy $2000 \div 45.14 = 44.3$ cu.ft.

The Mine-Cave Problem

In the solution of the mine-cave problem, there must often be considered a combination of facts, circumstances and conditions bearing on the case and affecting the results. These pertain mostly to the detailed manner of working the underlying seam or seams. An inquiry that often interjects itself in the solution of such a problem is: To what extent is the explosive force of the powder used in blasting, in the mine, effective at the surface?

In the mining of anthracite coal, under ordinary conditions, what energy is exerted or what is the sum total of the blow struck by the explosion of, say 25 lb. of black powder, the force of the blow to be expressed in tons; assuming that the force of the blast, in the mine, was sufficient to dislodge, say 1.14 tons of coal per pound of powder. The coal dislodged was, of course, in the line of least resistance; but, assuming the coal still in position at the initial moment of the explosion of the powder, is the force exerted equally in all directions, against the top, sides and bottom of the seam and what is the energy of the blast?

What is the effect of this explosive force to produce vibration or jar in the strata overlying the seam of coal, and how can this effect be reasonably or practically measured? What is the thickness of the overlying strata necessary to nullify or reduce to a negligible quantity the jar or vibration produced by a blast? Or, again, suppose 25 lb. of powder are exploded in 25 separate blasts, at the same time; will the combined blow be equal to or greater than what would result from the discharge of the same weight of powder, in a single blast?

ENGINEER.

Scranton, Penn.

The energy exerted in the explosion of black blasting powder is commonly estimated as 360 ft.-tons; and the total energy developed in the explosion of 25 lb. of black blasting powder would be $25 \times 360 = 9000$ ft.-tons. This means that if the whole energy of the blast were to be exerted in one direction, it would be capable of lifting a weight of 9000 tons through a distance of 1 ft.

This, however, does not have much practical bearing on the question of ascertaining the effect of the explosion of this weight of powder to produce vibration at the surface. Neither does the fact that the explosive force is such as to dislodge 1.14 tons of coal per pound of powder, in any way, assist in answering the question.

The charge of powder exploded is the center of a radiating explosive force, which is therefore exerted in all directions from that center. The vibratory effect produced at the surface will depend on the nature of the strata overlying the charge and the depth of the charge below the surface. Some strata are elastic and readily transmit a vibratory motion, while other strata are dead and do not respond to vibration. Moreover, the physical character of the strata, as determined by such features as the joints, cleats, fault lines and uniform structure of the rock, influence largely the transmission of the vibratory shock caused by the blast.

The jar or shock due to a mine blast is often felt a great distance in one direction, while it is scarcely perceptible in other directions, owing to peculiar geological formations, in the strata, that facilitate the transmission of the shock. On this account, the problem of calculating the effect of a mine blast at the surface is not a possible one. The effect of such a blast can only be determined, practically, by observations made with a delicate instrument, called a tromometer, for determining earth tremors. For the same reason, it would be impossible to make any calculation for determining the thickness of the strata necessary to nullify the jar or vibration at the surface.

In regard to the last question, the combined blow of 25 simultaneous blasts, if the charges are not too far separated from each other, would probably exceed, in effect, the blow caused by the same weight of powder exploded in a single blast. The reason for this opinion is that the 25 blasts properly placed would have a greater effect to break the rock, and the explosive force would be distributed over a larger area.

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What horsepower will be required to hoist 1500 tons of coal, in nine hours, from a shaft 575 ft. deep; making an allowance of 10 per cent. of the power for overcoming friction and ⅓ of the time for delays?

Ans.—Allowing ⅓ of the time for delays, leaves ⅔ × 9 = 6 hr. for actual hoisting. Adding 10 per cent. for friction or multiplying by 1.10, the work performed is

$$\frac{1.10\ (1500 \times 2000)\ 575}{6 \times 60} = 5{,}270{,}833\ ft.\text{-}lb.\ per\ min.$$

Since 1 hp. is equivalent to 33,000 ft.-lb. per min., the horsepower required, in this case, is

$$\frac{5{,}270{,}833}{33{,}000} = say\ 160\ hp.$$

Ques.—A certain mine has an output of 1200 tons in nine hours, from a slope. The slope rises on a grade of 1 in 8, for 2400 ft. pitch distance. The velocity of the loaded cars is 8 miles per hr., and that of the empty cars 14 miles per hr. The time lost in dumping the cars and starting and stopping the trips is 2 min., for each round trip. The capacity of the mine cars is 6720 lb., and the weight 1000 lb., for each car; and the weight of the rope is 3.375 lb. per running foot. What horsepower will be required to do this work?

Ans.—The total working time is 9 × 60 = 540 min. If the grade has a rise of 1 ft. vertical height, in each 8 ft. of pitch distance, the total rise is 2400 ÷ 8 = 300 ft. The velocity of the loaded cars is (8 × 5280) ÷ 60 = 704 ft. per min. The velocity of the empty cars is (14 × 5280) ÷ 60 = 1232 ft. per min. The time of hoisting a single trip of loaded cars is 2400 ÷ 704 = 3.41 min. The time of lowering a trip of empty cars is 2400 ÷ 1232 = 1.95 min. Allowing 2 min. for dumping cars and starting and stopping trips, the total time consumed in making one round trip is 3.41 + 1.95 + 2 = 7.36, say 7⅓ min. On this basis, 72 trips would consume 72 × 7⅓ = 528 min. This would allow 540 — 528 = 12 min., for unavoidable delays, during the day.

In order to hoist 1200 tons in 72 trips, the total load per trip is

$$\frac{1200 \times 2000}{72} = 33{,}333\ lb.$$

Since each car carries 6720 lb. of coal, the number of cars per trip is 33,333 ÷ 6720 = say 5 cars. The weight hoisted each trip, including the weight of the coal, weight of cars and rope, is then 5(6720 + 1000) + 2400 × 3.375 = 46,700 lb.

Approximately, the gravity pull on the rope, due to the loaded trip, for a grade of 1 in 8, is one-eighth of the total weight of the load hoisted. Assuming a fair condition of the track and rolling stock, the friction pull may be taken as one-fortieth of the weight hoisted. On this basis, the gravity pull is 46,700 ÷ 8 = 5837.5 lb., and the friction pull is 46,700 ÷ 40 = 1167.5. This makes the total load on the rope 5837.5 + 1167.5 = say 7000 lb.

Now, assuming an unbalanced hoist, the power of the engine must be sufficient to produce a pull of 7000 lb., at a velocity of 704 ft. per min., which gives

$$\frac{7000 \times 704}{33{,}000} = say\ 150\ hp.$$

Ques.—How would you treat persons suffering from broken limbs, bruises and cuts? Explain fully.

Ans.—Treatment depends on the character of the injury. If a limb is broken, shock often results and must be treated. Place the patient in a safe position on his back with the head low. If vomiting occurs, turn the head to one side. If the victim is conscious, water may be given. If the clothing is to be removed, cut it off. Hold ammonia or smelling salts to the nose, if procurable. Examine for bleeding and if that is severe apply a tourniquet or compress. Keep the patient warm by the application of blankets, coats, hot-water bottles, hot bricks, hot cloths, etc. Rub the legs and arms toward the body, under covers, to quicken the circulation.

If it is a simple fracture, adjust the limb gently and apply suitable splints, taking care that the points of the broken bones do not pierce the flesh. If the fracture is compound, cut away the clothing. Use every precaution to prevent any movement of the sharp ends of bones. Do not touch the wound with the fingers. If a bone protrudes, do not attempt to restore it to its place. Cover the wound with a surgically clean compress and hold the bones in place with padded splints.

Bruises if slight need no treatment; but if severe very hot or very cold water, ice, arnica, or witch-hazel should be applied. If arnica or witch-hazel is used, saturate a cloth with the liquid and apply to the bruise. If possible, keep the injured part elevated, thus diminishing the flow of blood in that part. Cuts, if bleeding is not profuse, may be left for the doctor to treat.

Ques.—What is the highest percentage of explosive gas in which you deem it safe to carry on blasting operations in the mine?

Ans.—This will depend on the nature of the coal with respct to its inflammability and the fineness of the dust; the thickness of the seam and character of the roof and floor, as determining the size of the openings or volume of the workings; the method of mining the coal and working the mine; the velocity of the air current and its gaseous condition, or the kind and proportion of gases present in the air; and the kind of explosives used in blasting.

Under ordinary mining conditions, the blasting of anthracite coal is considered safe in the presence of 2 or even 2.5 per cent. of marsh gas; while, in many bituminous mines, especially if the coal is friable and inflammable, less than 1 per cent. of gas may make blasting dangerous. In either case, the danger is more imminent in contracted workings and thin seams.

COAL AND COKE NEWS

Washington, D. C.

It is now practically a certainty that within a comparatively short time, the Interstate Commerce Commission will hand down a decision in the anthracite coal cases which have been pending before it for some time past. The belief of coal men who have been following the situation closely and carefully is that the decision in these cases will order a material reduction in the charge for transporting anthracite coal from the mines to the seaboard.

It is being noted that in all recent cases in which the commission has passed upon rates affecting commodities which move in bulk or in which the traffic may be expected to grow as the density in population increases such as lumber, coal and the like it has been directed that rates shall be cut materially below their present level. The commission has undoubtedly accepted a general policy of reducing rates upon these bulky commodities, and of placing the burden of such advances as it may deem wise upon the more highly valued articles which move in smaller quantities and at much higher charges.

Another feature of the situation which has strengthened the belief that the cuts just indicated will be made is the fact that the Commission has refused to increase the bituminous coal rates whenever they have been presented to it for adjudication. The bituminous rates, taking them upon a basis of mileage equality, are far below the level of the anthracite rates, and it seems reasonable to suppose that the commission will endeavor to produce greater equality between them by lowering the charges on anthracite, inasmuch as it has refused to raise those on bituminous.

Dissatisfaction is Manifested

Further statements issued by the West Virginia Mining Association with reference to the situation in the West Virginia district indicate that strong dissatisfaction exists with the tactics that have been followed by the United Mine Workers especially in view of the violation of the agreement between the operators of the Kanawha district and the mine workers. It appears that that contract included the following language:

It is understood that during the life of this agreement the United Mine Workers of America shall enter into no contract with any other operator in the Kanawha District carrying different terms or conditions to hose provided for herein.

Although this agreement does not expire till Mar. 31, 1914, the contract signed with the two Paint Creek companies July 15 provides for a material reduction in prices, as follows:

For splint machine-mined coal in rooms, the price is reduced from 32½ cents, which other operators in the district are required to pay for work on Kanawha Thick Vein No. 1 and 2 seams, to 29 cents; for splint machine-mined coal in entries the reduction is from 37 to 29 cents. Other reductions are as follows: Splint pick-mined coal from 26 to 25 cents; gas machine-mined coal in entries from 31 to 25 cents; gas pick-mined coal from 49 to 45 cents; airways and entries, splint coal, from 37 to 29 cents; airways and entries gas coal from 31 to 25 cents.

It is to be noted that the contract given the two Paint Creek companies provide even lower rates than the companies offered to pay when the long-drawn-out strike was threatened. The companies offered to pay the old scale, based on a rate of 47½ cents for pick-mining gas coal. The union insisted on an advance of 3 cents, run-of-mine, but compromised on an advance of 1½ cents, making the rate 49 cents, which the Kanawha Valley operators agreed to pay, and have paid up to the present, while the Paint Creek operators refused to accede the advance. Now, after a strike lasting 16 months, these two companies actually get a contract at a lower rate than they were willing to pay in the first place, while the operators who sacrificed their profits to purchase peace have, as they believe, been betrayed.

Reparation Awarded

The Interstate Commerce Commission has awarded reparation to the Marian Coal Co. against the Delaware, Lackawanna & Western R.R. Co. on account of unreasonable rates charged for the transportation of anthracite coal from Taylor, Penn., to Hoboken, N. J. An interesting point is raised in this decision in connection with the question "was the receipt of the original complaint against the rates an official filing of the claim with the Commission " The Commission says on this subject:

"We are of the opinion that it was. There is no question, as we understand it, that the complaint first received did contain a prayer for reparation to be paid to complainant based upon reasonable rates to be fixed by the Commission. There has been no intervention nor complaint filed by any other party. Neither the statute nor the rules of the Commission prescribe what act or acts shall constitute the filing of a claim for reparation with the Commission. The letter which accompanied the complaint is marked as received by the Commission, Aug. 15, 1910. We hold that on that date the claim was filed, and that shipments on which reparation is asked made within two years prior thereto are not barred.'

Senator Smoot on Free Coal

Senator Smoot in his attack upon the Democratic tariff bill during the past week devoted some special attention to the fact that coal was to be free under the tariff, and asserted that this would mean great injustice to the mines located in the Northwestern states.

HARRISBURG, PENN.

The Attorney General of Pennsylvania has ruled that the Auditor General was without legal justification in his attempted holdup of $17,000,000 of appropriations to important state departments, which included the department of mines.

On July 22, Auditor General Powell served notice on eighteen departments and commissions of the state that he would refuse to approve any warrants of departments of the state government created since the adoption of the constitution of 1874, until he was satisfied on two legal questions.

"First, whether they are legally a part of the executive branch of the state government, not having been mentioned in the constitution, which involves the question whether the legislature can create departments by statute.

"Second, what are the ordinary expenses of the executive branch of the government, which involves, the question of roads, maintenance of state police, etc."

No more drastic action has ever been taken since the office was created, and if the Auditor General does not accept the opinion of the Attorney General, the effects of his action may be far reaching, as the Supreme Court cannot be reached, except after an action is begun in the Dauphin County Court. The Supreme Court will not meet until the late fall. Should this be the case, it would paralyze many of the most important departments of the state, such as the Mines, Health, Highways, Constabulary, etc.

It is the general opinion that Mr. Powell will take up one or two departments and make a test case, so as not to hold up the state government, as he is being severely criticized throughout the state for his narrow actions.

The Public Service Bill

On July 26 the governor approved the public-service bill as it came from conference in the legislature. It is expected that the governor will name the seven public-service commissioners promptly as the commission law is now in effect. The old railway commission is legislated out of existence.

The powers of the commission will be far reaching, as this body will have authority to regulate the public service of all railroads, trolleys, etc., and will also have authority over rates, extensions and the like.

Provision is made for court appeal from decisions of the commission, and it may hold its hearings any place in the state. The commissioners will receive $10,000 a year and members serve for ten years.

Appropriations Are Slashed

The governor of Pennsylvania has announced that he has vetoed the appropriation of $150,000 for the mine fire under the city of Carbondale, Lackawanna County, and likewise the appropriation of $25,000 for the commission to investigate mine accidents in the anthracite region. Also the appropriation of $50,000 for the coöperation of the state in the establishment of a mining-experiment station for investigations with a view of better safeguarding the lives of miners, and for the greater efficiency of mining has been reduced to $25,000.

PENNSYLVANIA

Anthracite

Pottsville—Several hundred miners of the Glendower Colliery of the Philadelphia and Reading Coal and Iron Co. will have to be vaccinated at once, and the doctors are endeavoring to round up all the miners who attended a picnic two weeks ago, and all the persons who bought milk from the dairy, where the man who did the milking had smallpox. Three cases of the deadly disease have broken out among the men of this colliery.

Scranton—On July 23, fifteen hundred miners of the Sloan colliery operated by the Delaware, Lackawanna and Western R.R. Co., were thrown idle when the workings were discovered to be flooded. A sub-surface settling broke water mains, causing so much damage that the mine will probably be idle for a month.

Pittston—Several properties along the Erie tracks have been considerably damaged by mine caves. Some days ago the officials of the company notified the people to be on the lookout for caves. It is thought the heavy rains caused the subsidence of the earth, but the damage done is due to the workings of the old Butler mine and the robbing of pillars.

Wilkes-Barre—By an opinion handed down by the Courts of Luzerne County, the Delaware and Hudson Co. will be compelled to pay $33,634 with interest from Oct. 1, 1912, and must also render an accounting for all coal mined since July 16, 1878 that would have passed through a ¾-in. square mesh and over a ⅝-in. square mesh screen.

The suit is one brought by the Girard Trust Co. and others, trustee, heirs, and executors of the estate of the late L. D. Shoemaker, and concerned the provisions of a lease for coal land worked by the D. & H. Co., and especially over payments for certain smaller sizes of coal. The plaintiffs charged that the company mined a considerable quantity of small sized coal on which it paid no royalty, and asked for an accounting of this coal and payment therefor.

Bituminous

Pittsburgh—Damages of $50,000 are demanded in a suit filed by Marion Hale and her six children against the United Coal Co. The damages are claimed because of the death of Alfred Hale, husband of the plaintiff, who was killed at a coal mine of the defendant at Milesville on Apr. 2. 1913.

Fairbanks—J. W. Paul and Charles Enzian, connected with the National Bureau of Mines made an investigation on July 22 of the fire which is burning in the Solon mine of the Prospect Coal and Coke Co. Samples of the gas have been taken, and after analyzing these, methods will be suggested as to fighting the fire.

Although the fire has been raging for several weeks, it does not endanger the working portion of the mine. It is the opinion of experts that this gob fire will continue for some time to come and it is possible that it will burn itself out.

Waynesburg—A suit in ejectment was filed in the local court July 24, against W. Harry Brown, the coal operator of Pittsburgh, by Charles W. Weltner and others. The suit involves coal property, title to which is held by Brown.

The plaintiffs claim that last January, Brown purchased from J. V. Thompson of Uniontown a tract of coal land, about 1700 acres in all, at $1000 per acre. It was alleged in the petition that 99 acres of this property Thompson did not own and therefore Brown does not possess legal title thereto.

Uniontown—Suit for $20,000 was entered, July 25, against the Sunshine Coal and Coke Co. by Albert Cruse a miner, who alleges that he was permanently injured by an accident in the mine at Lynn Station on Feb. 27 of this year.

All of the coal and mining rights of the W. A. Stone Coal and Coke Co., of Uniontown have been transferred to the W. A. Stone Fuel Co. of the same place. The consideration named was $147,950.

WEST VIRGINIA

Charleston—On July 24 four men were killed in a battle between striking miners and watchmen employed by the Wake Forest Coal Co. on Cabin Creek. Since the shooting in this region a few weeks ago the coal operators have had watchmen scout the hillside before the non-union miners enter or leave the mine. While performing this duty two of the watchmen at the above named mine were fired upon.

Huntington—Twenty-seven thousand acres of Island Creek coal land in Logan County have been leased for immediate development by John Laing from Cole & Crane, Cincinnati capitalists and timbermen. This tract is located in one of the finest coal fields of West Virginia and the operation which is soon to begn will involve millions of dollars and it is expected result in an output of approximately 5,000,000 tons annually.

MARYLAND

Cumberland—Two hundred miners of the Small Vein mine No. 15, George's Creek Coal Co. at Lonaconing walked out on July 25 because of alleged short weight.

KENTUCKY

Louisville—The Nebo Coal Co., recently organized in Louisville to operate the famous Nebo vein in Western Kentucky, is busy getting things in shape at the mines for the coming season's business. Considerable new machinery is being purchased and installed, and much work was found necessary within the mine itself, where falls and other obstructions must be removed before work can be begun in getting out coal. For the present the company will open no new operations, contenting itself with placing those now open in good shape.

Whitesburg—J. B. Hoge and associates, of Whitesburg, have purchased of Archie Crane, of Sergeant, Ky., a tract of coal and timber land, and plan its immediate development.

Lexington—The Eastern Kentucky Land Corporation, recently incorporated at Lexington, Ky., with a capital stock of $100,000, has acquired 5000 acres of coal lands in Owsley and Perry counties,, on Buffalo and Squabble Creek. The property will be held by the company, and leased to operating concerns, as the company does not intend itself to be engaged in either coal or timber operations.

OHIO

Columbus—The Ohio Mine Commission appointed by Governor Cox to investigate the method of payment for coal mined in Ohio started out on its investigation last week. The first place visited was that of Jackson and the commission then moved to Ironton to investigate the Pine Grove mines at that place. The commission has made up an itinerary consisting of all the principal fields of the state.

East Liverpool—The West Point Coal Co. which has a large coal area and several producing mines near this place has leased its holdings to the Kirk-Dunn Coal Co., of Cleveland of which W. H. Dunn, of Salem, Ohio is manager. The new company will improve the equipment of the mine and will increase its capacity to 600 tons daily.

McLuney—The Zanesville Coal Co. owner of the Keystone mine No. 2 at McLuney, Perry County, Ohio has abandoned the mine and moved all of the equipment to mine No. 1 nearby. All of the coal land owned by the company that can be reached through this entrance has been mined.

INDIANA

Augusta—The Hartwell coal mining property situated near Augusta has been sold to a syndicate of St. Louis capitalists, the reported price being $90,000. These mines have been idle for the past three years, the property being in litigation. When in operation it employed over 400 miners and was among the best equipped mines in the country. The purchasers expect to open the mines at once, and operate them to their fullest capacity.

ILLINOIS

Nashville—The Nicholson coal mine which has been in the hands of a receiver for several months was sold on July 21 to Clarence Dallam, of Louisville, for $2000. Mr. Dallam will continue to run the mine until the court approves of the sale. The total indebtedness of the property amounts to $55,000.

Lincoln—Charged with defrauding the Lincoln Coal Mining Co. and its employees by falsifying weight, William Dugan, John and Richard Roe will face the charge of conspiracy against the company and the United Mine Workers. It is alleged that Dugan, the check weighman of the mine conspired with others in manipulating the weights and divided the profits. The amount said to be involved is $18,000.

NORTH DAKOTA

Kenmare—B. A. Bertelson reports that he has struck a 6-ft. bed of coal of unusual hardness at a depth of 174 ft. in his Spiral mine. In going down to this depth he passed through other seams and is certain that he has struck the deepest-lying lignite deposit and one which is not now being worked.

ARKANSAS

Hartford—State mine inspector, Thomas H. Shaw on July 21 closed mine No. 4 of the Central Coal & Coke Co. at Hartford until refuge holes could be cut in the mine tunnels as required by the state mining laws. Refuge holes are being rapidly cut, and the mine will be permitted to resume operations as soon as this work is completed.

FOREIGN NEWS

Gellenkirchen, Germany—On July 23 the bodies of 14 coal miners were found dead in a pit where they were entombed the day before by a fall of coal. It appears that a large area above the mine caved in as the result of extremely heavy rainfall.

Montevidéo, Uruguay—Money is not being stinted in Uruguay in the effort that the government is making in prospecting for coal. Coal seams outcrop in many places in the republic but surface indications in most of them are not promising. Extensive development, however is being carried on at several points, notably at Canadá de los Burros, in the Department of Cerro Largo. The work is being done under the direction of the National Institute of Geology, which is directed by Americans. The high price of coal in Uruguay handicaps industries of many kinds, and the government has shown great energy in attempting to secure cheaper fuel.

Panama—Improvements at the yards of the Caledonian Collieries Ltd., the largest shippers of Australian coal to South America, in Valparaiso, Santiago, Antofagasta and Callao, leads to the belief that this company is preparing to fight for this market. It is generally predicted that American coal will supplant Australian on the west coast as soon as the Panama canal is opened.

PERSONALS

F. R. Wadleigh, consulting fuel engineer, sailed on the "Celtic," July 23, for a two months' trip on professional business at different points in Europe.

State Senator William Green, of Ohio has been appointed International Secretary-Treasurer of the United Mine Workers of America to fill a vacancy created by the resignation of Edwin Perry, of Oskaloosa, Iowa.

Following a service of several years as superintendent of the landings of the Monongahela River Consolidated Coal & Coke Co. east of Louisville, Ky. George Dustin has resigned and will accept a position with a sand company in New Orleans.

J. W. Powell, superintendent and mine manager of the Columbia Coal & Coke Co., has severed his connection with that company owing to the indefinite suspension of operations at their mines. He is now visiting in the East among the anthracite mines.

F. C. Cornet, mining engineer, has given up his office at Charleston, W. Va., to accept the position of general manager of the Elkhorn Gas, Coal & Mining Co., at Melvin, Ky. This company has just been incorporated, in West Virginia, by Messrs. Schlesinger & Weeks, of Milwaukee, Wis. The new company replaces the old Beaver Creek Fuel Co.

William Grelley, well known in eastern Ohio and West Virginia coal regions has resigned his position with the West Virginia Pittsburgh Coal Co. at Wellsburg to take charge of the Buckeye mine near Flushing, Ohio, as superintendent. John T. McMahon, formerly with the United States Coal Co. at Bradley, Ohio has succeeded him with the West Virginia Pittsburgh Co.

A number of changes have recently been made in the personnel of the Davis Coal & Coke Co. Lee Ott, general superintendent, has resigned to become a member of the Board of Control of the state of Pennsylvania. His successor has not yet been named. W. W. Brewer, of the Weaver plant has been made superintendent of the Pierce plant to succeed Charles Connor resigned. H. B. Harrison, of the Elks Garden plant is made superintendent of the Weaver operations, while J. E. Ott succeeds Mr. Harrison as superintendent at Elks Garden. Harry Sharp formerly with the Youghiogheny Coal Co. has been appointed assistant to the general superintendent.

OBITUARY

H. A. Nelson, for thirty years connected with the Pleasant Valley Coal Co., Utah Fuel Co. and Wasatch Store Co., died at his home 969 East South Temple St., Salt Lake City Utah early July 18 at the age of 53 years. Mr. Nelson was widely known and universally liked.

CONSTRUCTION NEWS

East Liverpool, Ohio—John Blackford of Pennsylvania Ave. is having a shaft sunk for a new coal mine in Klondyke.

Sykesville, Penn.—The Erie Co. has advertised for bids on the sinking of two immense shafts at Cramer, two miles south of this place.

Johntown, Penn.—The Link-Belt Co., of Philadelphia has secured the contract for screening and picking equipment for the Valley Smokeless Coal Co., Mine No. 2.

Russelton, Penn.—The Bessemer Coal & Coke Co. has recently asked Pittsburgh contractors for estimates on a brick power house and engine plant at Russelton.

Martins Ferry, Ohio—A new tipple is being erected by the Belmont Coal Co. at the Glencoe mine. This structure will be 150 ft. long, built of wood and will not be completed for some time.

Marquette, Mich.—Work has been started on the construction of a 300-ft. extension to the C. Reiss Coal Co's dock at Escanaba. In addition to the dock extension, two new steel bridges for the distribution of coal upon the dock will be erected.

Holden, Va.—The United States Coal & Oil Co. has awarded the contract for an extension of their No. 7 tipple to the Link-Belt Co., Philadelphia. This new addition consists of a picking table and electrically operated loading boom, all housed in steel.

Elmira, N. Y.—The Delaware, Lackawanna & Western R.R. Co. has a force of men employed in constructing the super-structure for a new coal elevator for the Chemung Coal Co. which will replace the trestle that has been in use by that firm on East Washington Ave.

Joliet, Ill.—Louis Wilbutte, the contractor, has begun putting in concrete for the foundation of the 18 additional coke ovens for the Joliet Coal Products Co. These ovens are expected to be complete by Oct. 1, and the cost of their installation will be approximately $375,000.

Whitesburg, Ky.—Engineers are locating the Rockhouse branch of the Lexington & Eastern R.R. up Rockhouse Creek an important coal and timber section of this county. This work will be completed in about 15 days and immediately thereafter contracts are to be let for the construction of the road.

Morgantown, W. Va.—In anticipation of further enlargement of its plants at both Masontown and Burt, the Elkins Coal & Coke Co. has let the contract for the consruction of 26 five-room, two-story dwellings for the use of miners' families. Fourteen of these will be erected at Burt, and 12 are to be built at Masontown.

Chicago, Ill.—The Malcolmson Briquetting Co. have closed a deal with the Pacific Coast Coal Co. at Seattle for a complete coal briquetting plant having a capacity of 30 tons per hour of 10 oz. briquettes. The Rutledge press will be used, the entire plant being similar in design to that of the Berwind Fuel Co. The estimated cost of the plant is $250,000.

Windber, Penn.—The Berwind-White Coal Mining Co. has recently contracted with the Dodge Manufacturing Co., of Pittsburgh, for a 350 h.p. Dodge American system rope drive to connect a motor with a mine fan. The sheaves will be 40 in. and 96 in. in diameter carrying 20 rope grooves and are to be set 24 ft. on centers; 1400 ft. of 1-in. Firmus manila transmission rope together with the necessary tension equipment will also be furnished.

Connellsville, Penn.—The H. C. Frick Coke Co. has awarded the contract for 60 new houses to be built in various parts of the Connellsville region, to D. M. Fair & Sons, the approximate cost being $140,000. Thirty of the houses will be built at Colonial, seven at Lemont, five at York Run, ten at Sloan, and four at Colonial Nos. 1 and 3. Superintendents' houses will also be built at Edenborn, Wynn and Lemont.

Kempton, W. Va.—The Davis Coal & Coke Co. has completed plans for opening another mine near Kempton. The contract for sinking the shaft for the additional mining operations has been awarded to the Dravo Contracting Co., of Pittsburgh while the necessary railroad facilities will be provided by the construction of a branch line of the Western Maryland Ry. from a point near Henry, a distance of about three miles. The contract for this railway construction has already been awarded to G. L. Anderson & Bros., of Altoona, Penn.

Elmore, W. Va.—The Roberts & Schaefer Co. have closed a contract with the Virginian R.R. for a 400-ton capacity reinforced counterbalanced bucket locomotive coaling station to be built at Elmore, W. Va., at the approximate contract price of $30,000. This will be one of the largest and most complicated coaling plants ever built in this country being equipped with machinery for screening and crushing run of mine coal to stoker size which is used in the heavy Mallet compound locomotives which the Virginian employs in its coal traffic.

Melvin, Ky.—The Baltimore & Ohio is building a line 32 miles long into the Schlesinger lands. This line will, for the present, connect with the Chesapeake & Ohio R.R., at Beaver Creek station. The Baltimore & Ohio Co. has just completed a survey down the Big Sandy River to the Ohio River, crossing that stream at Huntington, W. Va. This new line will parallel the Chesapeake & Ohio line for over 110 miles, along the Big Sandy River, and will serve to transport the coal not only from the Schlesinger lands, by the 32-mile branch mentioned, but also from the new operations of the Consolidation Coal Co., in Letcher county, now connected with the B. & O. by the Sandy Valley & Elkhorn Ry., a part of the B. & O. system running from Jenkins, Letcher County, to Shelby, a distance of 28 miles.

NEW INCORPORATIONS

Ashland, Ky.—The Middle West Coal Co. has increased its capital from $50,000 to $100,000.

Harlan, Ky.—The Lynn Hollow Coal Co., of Harlan is increasing its capital stock from $10,000 to $25,000.

North Lima, Ohio—The North Lima Coal Co., has been incorporated by James Aspenwell and others with a capital stock of $10,000.

Denver, Colo.—The Crested Butte Anthracite Mining Co. has been incorporated with a capital stock of $500,000 by Frank Buckley, R. F. Buckley, and Joseph Deedlartz, all of Denver.

St. Louis, Mo.—The Southern Illinois Coal & Coke Co. has been licensed to do business in the State of Missouri. The capital stock is $1,000,000 and the headquarters are located in St. Louis.

Fort Smith, Ark.—Articles of incorporation have been granted to the Royal Coal Co. with a capital stock of $100,000. The incorporators are Wash Pigg, W. H. Collier, and E. L. Collier.

Denver, Colo.—The Turner Coal Co. has been incorporated with a capital stock of $100,000. The incorporators are James Turner, James C. Dick, of Huerfano County, and George Peart, of Denver.

INDUSTRIAL NEWS

Centralia, Ore.—Following the discovery a short time ago of a 12-ft. vein of coal four miles south of Wynlock steps are already being taken for its development.

Virgie, Ky.—On July 23 the Elkhorn Gas Coal Mining Co. took over the business and works of the Beaver Creek Fuel Co. The address of the new firm is Melvin, Ky.

Huntington, W. Va.—A seven-foot vein of coal of the finest quality has been uncovered on the Holderby farm near the city's edge. This discovery was made at a depth of 199 feet.

Philadelphia, Penn.—For the first half of this year the coal and coke shipments on the Pennsylvania R.R. east of Pittsburgh amounted to 37,087,558 tons, or an increase of 3,621,215 tons.

Cincinnati, Ohio—Edwin Marmet and Charles W. Poysell have been appointed receivers for the Marmet Coal Co. It is believed that this receivership will be only temporary as the assets of the firm greatly exceed its liabilities.

Farmington, Ill.—It is reported that a new coal mine will be located about one mile west of this town. It is believed this will be operated by the Alden Coal Co., of Davenport, Iowa. Surveys and grading will be begun at once.

Rockland, Me.—The Schooner, Charles H. Sprague, of New York, bound from Philadelphia to St. John, New Brunswick with a load of coal sprung a leak and sank off Menhegan on the night of July 23. Captain Elmer Greenlaw and all members of the crew were rescued.

Philadelphia, Penn.—Alleging that the Pennsylvania R.R. is violating the commodity clause of the Commerce Law by granting to certain coal shippers rebates and privileges, the Mitchell Coal & Coke Co., of Philadelphia recently filed complaint with the Interstate Commerce Commission.

Birmingham, Ala.—The Tennessee Coal Iron & R.R. Co. has renewed the contract with the Alabama Co. for the coal mined at the Searles mines in Tuscaloosa County. Not only will steam coal be taken on this contract but practically all of that mined at Searles during the balance of the year.

Bluefield, W. Va.—The property known as the Southern Pocahontas Coal Co. has been recently sold to a mining syndicate headed by Thomas T. Boswell, and Edward T. Boswell. This property which is located near Richland, Va., is already equipped ready for resumption of work.

New York, N. Y.—The New York court has recently declared the law prohibiting the use of bituminous coal in that city as unconstitutional. Health Commissioner Lederle says that one can now burn soft coal in New York legally, but he deprecates the result to the health and comfort of the community.

Cambridge, Ohio—The O'Gara Coal Co. has announced that it will abandon the Derwent Coal Mine. All of the 300 employees have been discharged. The generators will be taken to the Imperial mine at Belle Valley and the other machinery will be shipped to the Illinois field where the company has 21 operating mines.

Birmingham, Ala.—One thousand five hundred new coal cars are to be bought by the Southern Ry. during the next few weeks. Of this number, 1000 will be hopper cars, and the balance of the gondola type. The Virginia Northwestern Ry. which is owned by the Southern was also authorized to purchase 500 coal cars.

Vancouver, B. C.—The Canadian Pacific Ry. will use oil as fuel instead of coal, for its locomotives on the Cascade division of the main line between Vancouver and North Bend. Tanks for the fuel have been located in Fort Moody and it is now proposed to have the oil piped to Cokuitlam where the company shops are located.

New York, N. Y.—Manning, Maxwell & Moore, Inc., together with their subsidiary companies will on or about Oct. 1 next move their office from 85-89 Liberty St. to the new Lewisohn Building, 113-119 W. 40th St. This change is being made in order to secure both a more central location and more commodious offices and store rooms.

Denver, Colo.—The Interstate Commerce Commission has held that the Denver & Rio Grande Ry.'s ownership of the Utah Fuel Co. and its competition commercially in interstate markets is in violation of the commodity clause of the Interstate Commerce Law. This decision implies that the railroad must dispose of its $10,000,000 worth of coal property.

San Francisco, Calif.—Within the past few months, 20 coal carrying vessels laden with a total of over 120,000 tons of coal have sailed from Norfolk, Baltimore, and Newport News, and are now stationed at various ports of the Pacific where their cargoes can be available at a moment's notice for cruisers or battle ships. Other supplies have also been sent to Pearl Harbor, Honolulu, where additional bunkers have been completed.

Monongahela, Penn.—Nine hundred acres of Pittsburgh vein coal recently passed into new hands with the immediate prospect of development upon a large scale. The amount involved is said to be $800 an acre which with contemplated improvements will bring the amount expended to about $1,000,000. The openings for the mines will be almost opposite the Hazel Kirk mine of the Pittsburgh Westmoreland Co. with shipping facilities on the Pennsylvania R.R.

Milwaukee, Wis.—George Manierre announces that he has acquired the patent, patterns, drawings and other assets of the late Ticknor-Manierre Co. which has gone out of business and that he will continue the manufacture of box car loading machinery under the style of the Northern Conveying Machinery Co., at 418 Engineering Building, Milwaukee, Wis. The efficiency and practicability of the loaders manufactured under the Ticknor-Manierre patent have been thoroughly demonstrated in the past.

Pittsburgh, Penn.—The National Tube Co. announces that commencing Aug. 1, 1913, it will enter the elecrical conduit field. It has contracted with the National Metal Molding Co. and the Safety-Armorite Conduit Co., both of Pittsburgh, Penn., to manufacture and sell this product for it as its agents, under their various brands. It has also decided to sell this product on the "Pittsburgh basing discount" plan in the same manner as all wrought pipe for other purposes has been sold for the past thirteen years.

COAL TRADE REVIEWS

GENERAL REVIEW

Difficulty in obtaining adequate shipments of soft coal is causing some uneasiness. Little coal in the hands of the consumers and the demand is heavy in all sections. Better grades are entirely out of the market. Hard coal quiet and featureless.

The midsummer dullness on hard coal is now acutely evident, and the demand has fallen off to practically nothing. The individuals are raiding the market with low-priced coal, and this is about the only business that is being done. The steam grades are particularly heavy and can be moved only when the consumer is forced to take a certain proportion of the small sizes in order to obtain any shipments of the domestics. There is considerable interest in the new hard-coal tax.

The difficulty in obtaining adequate shipments of bituminous in the Eastern Coastwise trade is causing apprehension over what the situation will be when the fall and winter activity sets in. Although the congestion at Hampton Roads is clearing up rapidly, the movement into New England continues slow and there is much uncertainty over what tonnages can be expected. While spotty on occasions the trade as a whole is strong and large consumers, who are attempting to accumulate surpluses against a possible stringency in the fall and winter, are finding it impossible to do so. Though the market may ease up slightly this month, this is doubtful, and will not in any event, be of any serious proportion.

The Pittsburgh district is experiencing one of its best years. Mines are operating up to the full limit of the car and labor supply, both of which are good, so that the production is heavy. The prompt demand is relatively light, the heavy movement being principally on contracts. There is little coal in the hands of the consumers and the renewed activity in iron may cause a further stiffening in the coal and coke markets. The seller is still in full control and there will be little surplus fuel for some time.

The Ohio trade continues to maintain an activity far above normal. The steam grades are particularly hard, due to the increased manufacturing demand and heavy consumption on the railroads and in the iron and steel business. The Pocahontas grades in the Lake market are practically unobtainable. Foreign shipments out of Hampton Roads have eased up, but the Coastwise business is heavier; prices are holding up, and production is much improved, although there is still a shortage at the piers.

In the Southern markets the producers are issuing warnings, urging the consumers to stock against the possibility of a serious car shortage, but as usual such notices are most commonly ignored; domestic prices continue firm, but the steam grades have eased up slightly. The improvement in the Middlewestern market continues. Although the steam grades are a trifle weaker, the domestic sizes are showing a satisfactory improvement, and indications are that they will hold steady throughout the balance of the season.

BOSTON, MASS.

Uncertainty over what tonnage can be relied upon from West Virginia is causing apprehension. Congestion at Hampton Roads is gradually clearing up but all agencies are well sold. Prices stiff and firm.

Bituminous—The market here shows little change from a week ago. There is, however, an undertone of apprehension over the outlook for supplies in the late fall and winter. Pocahontas, New River and Georges Creek, on which tidewater New England so largely depends, are coming forward slowly and there is not enough improvement in despatch at the loading piers to warrant a cheerful view. At Hampton Roads the congestion due to the suspension early in July is gradually clearing up, but as August comes along it is seen that by far the most of the agencies have all the orders they can possibly take care of. Then, too, there seems a good deal of uncertainty over what output can be counted on from West Virginia, the labor shortage there being still a considerable factor.

Buyers at this end are keeping close watch on their shippers and there is a disposition apparent to make settlements on demurrage as easily as possible, so long as coal is forthcoming. There is an anxiety, too, on the part of corporations generally to be forehanded on supplies and if extra shipments are secured through such a policy something will have been done to relieve what in September and October may be a tightening situation. Prices on Pocahontas and New River are firm, sales having been made lately up to $3.10, f.o.b. There are a few shippers, however, who did not take much contract business and from such sources there is a small tonnage offering at down to $2.90 and $2.85, but the volume is insignificant.

Georges Creek continues strong and there is no surplus for sale at current prices. There are already rumblings of the anticipated car shortage and that is hardly a good sign in August. In Pennsylvania the operators are going carefully over their commitments to see what will be available the balance of the year and this is reflected in the extreme caution which selling agents show in response to inquiries for coal a month or two ahead. Prices are now about on the level of late June when a West Virginia strike seemed imminent.

Anthracite—There has been a mild rush to get hard coal forward late in July, chiefly to secure July billing, but now that another monthly advance is in force there will be another lull until about the twentieth. The dealers are not moving their stocks as fast as the spring trade seemed to indicate, but the first of September will doubtless see a spurt, especially in the cities. Broken is still in short supply, now particularly on account of the curtailment in mining, and gas companies and other large consumers are pressing for shipments.

Quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.15@1.45	$1.35@1.65	$1.67@1.77	
Philadelphia*	2.40@2.70	2.60@2.90	2.92@3.02	
New York*	2.70@3.00	2.90@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@3.10
Providence†				3.95@4.10
Boston†				4.05@4.15

*F.o.b. †On cars.

NEW YORK

Soft coal shows a tendency to ease up and may continue slightly softer the balance of the season. Still a sharp demand however and consumers taking full allotments on contracts. Hard coal easy with considerable going into storage.

Bituminous—The contract season on soft coal is now definitely closed. Any consumers who are still not under cover may possibly prevail upon concerns of which they are old customers to take care of them. It is only on such conditions, however, that contracting could be done and even in these instances operators would much prefer to carry any free tonnage they now have over into the fall trade. The prompt demand locally has eased up slightly during the week, which is no more than was to be expected in midsummer; it is very probable that it will continue more or less easy until preparations for the fall trade are actively under way. There were rumors of an acute car shortage on the B. & O. but the supply on the Pennsylvania and the New York Central have been wholly up to requirements, although trouble is anticipated before long. It is unofficially stated that the New Haven R.R. is in the market for 200,000 tons of coal. We continue New York prices on the following basis:

West Virginia steam, $2.55@2.60; fair grades of Pennsylvania, $2.75@2.80; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.25@3.30.

Anthracite—Hard coal continues stagnant and entirely devoid of interest with the possible exception of a great deal of unfavorable comment which has arisen over the new Pennsylvania state tax on anthracite. The move seems to have been entirely unexpected and no generally accepted policy has yet been adopted, either as regards increasing the cost to cover the new tax, or toward making a move to have it repealed. As a rule most companies have increased the price to the dealer sufficiently to cover the new tax burden, but there are a few notable exceptions to this.

Locally the trade is quiet. The steam sizes are particu-

larly heavy and are going into storage rapidly, while sales of the domestic grades are made only on condition that orders for a proportion of the small sizes be given at the same time. The labor supply is only fair and the mines are slackening up considerable. We quote New York prices as follows, the circular on domestic grades being 10c. above that for last week due to the regular monthly decrease in the discounts:

		Individual		
	Circular	Lehigh	Scranton	Schuylkill
Broken	$5.10	$4.45@$4.65	$4.50@$4.70	$4.45@$4.65
Egg	5.35	4.80@ 4.90	4.85@ 4.95	4.80@ 4.90
Stove	5.35	4.90	4.95	4.90 .....
Chestnut	5.60	5.05@ 5.15	5.10@ 5.20	5.05@ 5.15
Pea	3.50	3.25@ 3.45	3.30@ 3.50	3.25@ 3.45
Buckwheat	2.75	2.10@ 2.45	2.50@ 2.75	2.10@ 2.45
Rice	2.25	1.75@ 1.95	2.25	1.75@ 1.95
Barley	1.75	1.30@ 1.70	1.75	1.30@ 1.75

PHILADELPHIA, PENN.

Anthracite flat and individuals are offering concessions on nearly all grades. Demand has fallen off to almost nothing. Heavy winter business expected. Bituminous continues abnormally strong and active.

The usual mid-summer dullness is still holding on, and as the season advances it is not likely to improve. There seems to be more talk of investigations than business, due to the fact that many of the retail dealers, effective Aug. 1, contemplate an advance of 10c. per ton over the prices generally ruling at that time, to offset the new Pennsylvania state tax. The city authorities have been called on to inquire into the matter, but no steps have as yet been taken.

The market itself shows a lamentable lack of activity, and the only business of any account is being done by the individuals, who are resorting to their practice of cutting prices to induce trade. Outside of stove coal, the demand has fallen off to almost nothing, and the call for this size is only equalled by the requisitions of the consumer so that with many homes closed, there is not much business. As usual they will probably do nothing now, and in the fall be rushed to death. It is expected by many that the coming season will see practically a duplication of last year's experience, when all sizes were in short supply and hard to get.

The bituminous trade shows up in marked contrast to the anthracite. Good prices and large orders are being received, while the current demand is far in excess of the supply. The shortage is probably due to the lack of labor at the mines. However, producers have no complaint to make as they are finding business better than ever before. This is the consensus of opinion in the trade and there is a ready market for good, as well as the cheaper grades of coal. Many buyers are now bemoaning the fact that they did not profit by the advice of the operators, and make their purchases during the period of inactivity some two months ago.

PITTSBURGH, PENN.

Pittsburgh district experiencing one of the best seasons in years. Demand on contracts heavy but light in the spot market with few premiums offered. Coke situation unchanged and indications are that the producers will win their fight for the $2.50 price on second-half contracts.

Bituminous—The great activity in the Pittsburgh district continues, mines being operated up to the limit of labor and car supply. There has been less labor shortage than expected, and the same can be said of the cars. While there is a constant tendency toward congestion in railroad yards there has been no serious difficulty thus far. Demand for coal on contract is excellent, and has shown an improvement since the first of July, when there was a slight letting up, chiefly through plants closing for repairs. Demand for prompt coal is relatively light, and premiums are exceptional. On the whole, the Pittsburgh coal trade is experiencing one of the best years in its history. Free slack is being readily absorbed, much more so than usual at this season, and only a moderate tonnage can be picked up and only on a few lines, at less than the standard price. The pressure for coal in the Northwest is unabated. We continue to quote: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in. steam, $1.50; 1¼-in. domestic, $1.55 per ton at mine, Pittsburgh district.

Connellsville Coke—The restriction of coke production, in accordance with the program of merchant operators, is fully sufficient to meet the situation and maintain the $2.50 price so long demanded. Although prompt demand is light, there is hardly enough free coke to meet it, and buyers find difficulty in securing prompt lots at $2.50, a premium occasionally being paid. The market is quiet at the moment, but a tense feeling results from the knowledge that the requirements of furnaces which covered sparingly for July will come up again for August. However, the furnacemen are less averse to paying the $2.50 price than they were, for the pig-iron market has shown signs of stiffening, and a break in coke now would doubtless weaken iron again. We quote: Prompt furnace, $2.50@2.60; contract furnace, $2.50; prompt foundry, $2.85@3; contract foundry, $2.85@3, per ton at ovens.

BALTIMORE, MD.

Trade spotty at times but exceptionally strong as a whole. Occasional surpluses of slack, due to the heavy shipments of three-quarter to the Lakes. Foreign business slacked up some, but the coastwise movement is increasing.

July has been rounded out by the coal trade here in stronger form than any similar period for years. While the market is somewhat spotty from time to time, there is apparently every prospect for a steady August trade.

As a matter of fact, the present summer has been an excellent one in the trade. While the early spring saw a rather slow contracting period, the failure of big consumers to find any quantity of cheap coal early in the season, caused a quick movement to cover. Since that time, in spite of predictions to the contrary, the changes in the spot market, and in contract renewals, have been at advances for the most part. During the past week, slack was the only grade that could be marked spotty, and this was due to the rush movement of three-quarter toward the Lakes.

Considerable activity was to be noted at the piers. While the foreign movement showed a falling off, there was a large shipment coastwise. Southern consignments particularly showed an increase. For the next two weeks this will be even heavier, as a number of coal shippers will try to avoid the hurricane season along the Southern Atlantic seaboard, which usually appears about the middle of August. A number of loadings for Vera Cruz, and other Mexican ports, will be noted in the next few days.

The board of directors of the Baltimore Coal Exchange has passed a resolution declaring that the tax of 2½%, recently imposed by the State of Pennsylvania on anthracite coal, is unjust and burdensome on the consumer. The tax has been passed from the mines to the wholesalers, and from the latter to retailers, who have now decided to add 10c. per ton on the cost of coal to consumers, in order to meet the situation without direct loss.

Notices sent out by the Baltimore & Ohio R.R. announce an important change in coke rates to this port. As a result of the recent agitation of a certain Connellsville interest for a reduction, a cut of 35c. per ton was made, which is probably a record. The rate is reduced from $2.15 per ton to $1.80. West Virginia is favored with a similar cut, the rate being reduced from $1.95 to $1.60. It is understood that Philadelphia is also to have some reduction as well as some points in Ohio. The new tariff becomes effective Aug. 1. Coal men here are rather at loss to understand such a substantial cut on coke freight rates, when the rate on bituminous coal remains unchanged.

BUFFALO, N. Y.

Renewed activity in iron, which will have a further stimulating effect on coal. Consumers have little surplus and producers are in full control of the market.

There is no slacking off in the bituminous trade and the only difficulty is to get enough coal to meet the demand. It is believed that iron is about to follow coal in activity and stiffness in price. In fact it is declared that the movement has already begun. There has been a large amount of iron sold right along, but the price has been low, so that the complaint was that no money could be made in the trade. With iron active and crops in good condition the outlook is excellent in spite of the tariff revision and other troubles.

Consumers are so eager for any coal that they are now paying within about 15c. of Pittsburgh prices for Allegheny Valley coal, which is sometimes as much as 30c. lower. Jobbers also say that there is little surplus coal in the hands of consumers and as it appears now there is not going to be any for a long time hence. Most of them are not trying to buy any more than they need for early consumption. There is all of the former complaint of shortage of men, with cars growing scarcer every week. What the ultimate result will be is difficult to say but it is clear there will not be a surplus of coal right away. The consumer has lost all control of the market and must accept what he can get at sellers' prices. At the same time it is noted that there is not so much talk as there was of $2 coal at the mines. The operators and jobbers have become aware that with much more booming of the market, they will soon be digging coal out of every farm in the state of Pennsylvania.

Quotations are strong as ever on the former basis of $2.90 for Pittsburgh lump, $2.75 for three-quarter, $2.65 for mine-run and $2.15 for slack, with Allegheny Valley not more than 20c. lower. Coke is not much changed and may there-

fore be quoted as quiet at $4.85 for best Connellsville foundry.

There is no stir yet in anthracite and none is looked for till cool weather sets in. Some increase in the demand was created in the spring by the reduction in price, but the consumer is indifferent now. Members of the trade locally, as well as the public generally are speaking in an uncomfortable way of the 2½% Pennsylvania tax on anthracite and there is a growing belief that it will be pronounced unconstitutional by the courts. For that reason some of the shippers have refused to add it to their regular prices for the present.

Shipments of anthracite by lake were 162,580 tons, which is a large amount, though not so large as the month will average.

COLUMBUS, OHIO

Trade still active, despite the hot weather, which has curtailed the domestic demand. Lake market is strong. Steam business holding up well and price list is firmly maintained.

The coal trade continues to maintain its strong position of the past few weeks. There is a good demand for all grades and prices at the circular figures announced July 1 are well maintained. There is little shading of quotations reported, and on the whole the tone of the market is satisfactory in every way. The future outlook is bright, with the possible exception of an expected car shortage.

One of the best features of the trade is the good demand for steam grades. Manufacturing establishments are taking a large tonnage and in some cases increases in their requisitions are reported. Iron and steel companies are good consumers of steam fuel, also the railroads, which are having a heavy freight movement. Expiring contracts are being renewed at advanced figures over those of last year.

Domestic trade is strong despite the hot weather. Operators and jobbers report a large number of inquiries, mostly for delivery in August and September. Dealers have stocked up pretty well and will not be in the market for some little time. Consumers are placing orders, but deliveries from retail yards are not large. Threshing due to the heavy wheat crop is creating a demand for domestic grades in the rural sections of the state. Municipal contracts are being awarded and the same is true of school and office building contracts.

The demand from the Northwest is still good, and consequently the lake trade continues active. The tonnage going to the Northwest via the lake is larger than in years, and the indications are bright for a continuation of the heavy movement right up to the close of navigation. The tonnage handled by the Toledo docks of the Hocking Valley up to July 25 was 1,393,000.

As a result of the good car supply which is reported from all of the mining districts of the state, the output has been large. In the Hocking Valley the production was normal and the same is true of Pomeroy Bend district; in eastern Ohio, where the car supply has not been the best in the past, there was a 100% supply reported during the week. In the domestic fields of Jackson and Massillon the output was also larger than usual.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.60		$1.60	$1.60
¾ inch	1.45	$1.25	1.45	1.40
Nut	1.25		1.35	
Mine-run	1.25	1.15	1.25	1.20
Nut, pea and slack	0.65		0.65	0.60
Coarse slack	0.55	0.70	0.55	0.50

HAMPTON ROADS, VA.

Falling off in foreign shipments, but coastwise movement continues large. Heavier production at the mines and supplies at the piers are much improved but still inadequate. Prices being well maintained.

While the dumpings over the three Hampton Roads piers have been good there has at the same time been a falling off in the foreign shipments and it is doubtful if the past week will compare at all favorably with the first three weeks of July. There has been quite a good movement coastwise but a large portion of this business has been taken care of by practically one shipper, so that it will not offset the falling off in exports.

The working conditions at the mines having improved, coal is coming forward in much larger quantities than at any time during the month and the shortage at tidewater is greatly improved. A number of shippers are still short, however, and find it difficult to take care of contract business.

The demand for coal still continues good and prices range from $2.95 to $3.10 for New River-Pocahontas coals and Kanawha is bringing from $2.70 to $2.85. Foreign shipments have moved to Havana, Kingston and Georgetown, with one coastwise shipment to San Francisco.

TOLEDO, OHIO

Exceptionally heavy movement up the Lakes. Local demand for both steam and domestic grades above normal with prices firm. Pocahontas practically out of the market.

Conditions have not greatly changed here during the past week and there has been no variation in price. The coal movement on the Lakes has been exceptionally heavy for this season of the year and fully 200,000 tons of coal and coke were loaded at the C. H. & D. docks, the past week for up-lake shipment. The proportion of coke was small, being estimated at about 25,000 tons, the remainder being steam coal for which the demand is remarkably strong. The "Ward Ames," bound for Duluth with 10,500 tons capacity, is now loading at these docks. The reports at the customs office show that the coal movement for July up to this week has been 1,516,230 tons as against 707,651 tons for the entire month of July, 1912. Of this tonnage, 461,925 was for export shipment going to Lake Superior and Georgian Bay points.

The demand for both domestic and steam coal is good locally, far above normal for this season of the year, and prices are holding firm. There is practically no Pocahontas to be had. Following are the prices quoted here:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilon	Pitts. No. 8	Cambridge
Domestic lump	$2.50	$1.60	$2.50	$1.75	$2.50	$1.35	$1.35
Egg	2.25	1.20	2.50	1.50	2.50	....	....
Nut	1.80	1.20	2.25	1.50	2.50	....	....
¾ lump	....	1.35	....	....	....	1.20	1.20
Mine-run	1.50	1.10	....	....	....	1.10	1.10
Slack	....	0.70	....	....	....	0.80	....

LOUISVILLE, KY.

Movement to the Northwest slackening up, due to the inadequate labor supply there. Prices remain steady, however, and mines are working full time. Much complaint about the new class of equipment on the L. & N.

There has been little change in the market during the past week, except possibly a slight easing up in the demand from the Northwest. Prices are steady at the same level that has been prevailing for the last few weeks. There are a few complaints of car shortage, but for the most part the mines are running full time.

The distribution of the "battleship" type of cars is becoming more general and is also resulting in more complaints from the shippers. A committee of operators and dealers recently consulted with the traffic officials of the Louisville & Nashville, regarding the situation, and were promised prompt relief. It is a rather significant fact that the road itself will not accept about half of their fuel requirements in this class of equipment. Even few of the larger dealers are prepared to handle the new type of cars to an advantage, so that the complaint is general.

It is obviously unfair to expect a dealer to install the trestles necessary to handle the new equipment irrespective of the size or importance of their business; this, however, seems to be the position of the railroad in the matter. Considerable friction has also occurred between producers and dealers. One result of the new situation may be the loss of considerable business to the Louisville & Nashville R.R. Dealers who cannot handle the battleship cars to an advantage will, of course, order from mines on other roads when same is possible. This may thus eventually prove a serious disadvantage to the operators on the Louisville & Nashville Railroad.

There has been little or no coal stored by the dealers so far this season; as is always the case, this is due to the reluctance on the part of the dealers to tie up any considerable amount of money. The heavy movement into the North and Northwest still continues to be one of the best features in the local trade; the indications are that this will continue as long as the mines have surplus tonnages to ship those markets.

BIRMINGHAM, ALA.

Producers anticipate a severe car shortage and are urging consumers to stock. Steam grades easier but domestics are firm and there is an increased activity in the iron market.

While the warnings given out by the producers that heavy stocks should be laid in during the summer, owing to the probability of a serious car shortage, are, no doubt, timely, the buyers are not frightened. Steam prices have suffered to some extent, especially with the mines producing both steam and domestic coal, as such operators must move their steam product in order to be able to produce domestic grades. Domestic prices on standard coals are well maintained; in fact, some of the largest mines report they are behind on shipments of this grade of coal.

The pig-iron market, around which most other markets in this district usually revolve, shows more activity, but the volume of buying has been increased largely at the expense of prices and the lowest figures of the year now prevail.

NEW ORLEANS

Heavy shipments being made from the Alabama field; consumers endeavoring to cover before the car shortage develops. Receipts by water interfered with. Large tonnage started out of Pittsburgh.

In order to take full advantage of the abundance of cars, shipments of Alabama coal are being made on an unusually large basis. As the crop movement will soon begin taking the cars, every effort is being made to move as much of the fuel as possible now. Shipments from Alabama were curtailed to some extent earlier in the year from the fact that river transportation was expected to open. The navigation of the Warrior and Tombigbee rivers has been delayed by unexpected difficulties which the engineers encountered. As a consequence, the receipts of coal by water will not begin in time to assure the accumulation of any stock before winter. A contract for 20,000 tons of Alabama coke was let by the New Orleans Gas Light Co.

Unexpected high water in the Monongahela released over 1,000,000 bushels of coal, consigned to local dealers. It is feared that the low stage in the rivers will not allow it to come through soon, however. Shipments of domestic lump are moving to western Louisianna and eastern Texas. Demand for coal in the harbor has been unusually heavy during the past week. Trade in the city is normal and featureless.

DETROIT, MICH.

Producers are no longer showing any anxiety to contract and are apparently willing to take their chances in the spot market from now on. Indications for the fall trade excellent. Dealers endeavoring to accumulate reserve stocks.

Bituminous—The season is approaching when there is little or no inducement for producers to contract so that there is a tendency on the part of the buyers to close without further delay. The operator who has contracted for only half of his production, is more or less indifferent about the remainder and probably feels that he can do better by taking a chance on the spot market.

Indications for the fall trade are excellent. The domestic fuels, particularly the larger sizes, are already in strong demand, due to the fact that dealers are endeavoring to accumulate substantial reserve stocks in anticipation of a heavy demand this winter. However, there have been previous occasions when the market displayed a similar strength, but failed to realize the full expectations of the trade, so there is still some uncertainty over the future.

We continue local quotations on the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump.	$1.65	....	$1.60	....	....	$2.50	$2.25
Egg.....	1.65	....	1.60	....	....	2.50	2.25
Steam lump....	1.25	....	....	....	....	....	....
2-in. lump.....	1.15	$1.15	1.20	....	....	....	....
Mine-run.....	1.05	1.05	1.00	$1.00	$1.00	1.50	....
Slack.....	0.90	0.90	0.50	0.65	0.65	....	....

Anthracite—The local dealers are keeping well up with their orders and the hard-coal situation here is comparatively easy. Payment of the additional 10c. per ton to cover the new state tax on anthracite is being made under protest. There are hopes that dealers will be reimbursed for this, but apparently the new charge has come to stay. The smaller sizes are in long supply, and are becoming difficult to move.

ST. LOUIS, MO.

Local market on the edge of a sharp advance. However, steam grades continue heavy, and this is affecting the buoyancy in the other departments. Anthracite dull and inactive.

Judging from conditions the last week in July the long expected demand in the local coal market has almost arrived. Especially was this so on the screened sizes, such as lump and egg; on steam grades the market continues to get weaker, and the accumulation of steam sizes has prevented many mines from working, so that a shortage of lump and egg is almost in sight. It is likely that these conditions will continue to exist for the next month, as nut does not as a rule begin to move freely for the fall trade until about September.

Carterville screenings took another drop of 10c., and Standard screenings have been wavering for the past week with absolutely no demand. Standard lump coal is still being held at 80c. to 85c., and screenings at about 60c. to 65c. It costs more than 80c. to get this coal out in the form of mine-run, so it is still a losing proposition for the operators. Even with the prices of Carterville and Franklin County advancing on lump and egg, the falling off on steam coal prices enables these operators in some instances to break even, but a great many of them are still losing money.

The coke market is in a demoralized condition, various grades being offered in the past week at prices far below the circular. The same pertains to anthracite coal—one or two shippers having speculated on inferior grades, and now find that they are unable to dispose of them and will probably have to sell at a loss.

Very little smokeless is coming in and it is extremely hard to get, although Arkansas coal seems to be moving in far better than was anticipated.

The local market is quotable on the following basis:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump.....	.....	.....	.....	$0.90
3-in. lump.....	.....	.....	$1.25	.....
6-in. lump.....	$1.35 @ 1.50	.....	1.35	1.10
Lump and egg.....	.....	$2.10	1.30	.....
No. 1 nut.....	1.00 @ 1.15	.....	1.05	0.87½
Screenings.....	0.65	.....	.....	0.80
Mine-run.....	1.10	.....	.....	0.75
No. 1 washed nut.....	1.40 @ 1.50	.....	.....	.....
No. 2 washed nut.....	1.25 @ 1.35	.....	.....	.....
No. 3 washed nut.....	1.15 @ 1.20	.....	.....	.....
No. 4 washed nut.....	1.10 @ 1.20	.....	.....	.....
No. 5 washed nut.....	0.80 @ 0.90	.....	.....	.....

PORTLAND, ORE.

Customary Aug. 1 advance on Utah and southern Wyoming coals gone into effect. Market quiet and dull.

Coal dealers here have been notified that on Aug. 1, the wholesale price of coals on the Utah and south Wyoming mines will advance as usual at this time of the year in anticipation of the winter demand from $1.75 to $2.25 per ton for nut and from $2.25 to $2.75 per ton for lump. To what extent the advance at the mines will affect prices here is not known yet, but it is supposed that the local advance to the consumers will be commensurate with that assessed against the retailers. The weather has been tropical here for the past week and under the circumstances people are not inclined to turn their thoughts to fuel.

PRODUCTION AND TRANSPORTATION STATISTICS

COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during May and the first five months of this year in comparison to last year, in short tons:

Classes and Railroads	May		5 Months	
Anthracite:	1912	1913	1912	1913
B. & O. (a).....	18,496	107,494	601,152	665,488
C. & O. (a).....	364	2,638	14,806	6,981
Erie (c).....	289,854	*752,609	2,592,520	3,463,729
Penna. (a-c).....	109,341	967,896	3,688,943	4,641,994
Virginia (a-b).....	20	130	20	486
Total 5 roads.....	418,075	1,830,769	6,897,441	8,778,678
Bituminous:				
B. & O. (a).....	2,956,614	3,151,296	14,015,327	14,343,132
B. R. & P. (a-b).....	619,430	811,280	3,320,840	3,766,426
B. & Susq. (a-b).....	108,001	151,795	598,369	754,396
C. & O. (a).....	1,450,893	1,450,371	7,366,533	6,375,705
Erie (c).....	8,086	7,396	142,409	263,218
H. & BTM (a-b).....	72,942	99,691	574,965	574,667
N. Y. C. & H. R. (a-b)	598,593	672,425	3,434,116	3,791,585
N. & W. (a-b).....	1,955,495	2,151,745	9,077,058	9,369,541
Penna. (a-c).....	3,495,016	4,178,271	18,956,936	20,092,450
P. & L. E. (a-b).....	852,537	1,180,197	3,943,497	5,223,592
P. S. & N (a-b).....	181,372	214,065	600,164	1,123,050
Virginia (a-b).....	311,247	318,720	1,496,208	1,897,003
W. Md.....	269,939	248,063	1,236,905	1,254,612
Total 13 roads.....	12,880,165	14,615,315	64,973,327	68,829,427
Coke:				
B. & O. (a).....	439,631	434,898	1,910,286	1,721,410
B. R. & P. (a-b).....	49,423	45,711	183,711	255,154
B. & Susq. (a-b).....	15,111	26,060	97,197	130,271
C. & O. (a).....	25,157	29,438	105,100	150,523
N. Y. C. & H. R. (a-b)	7,136	4,233	36,780	29,385
N. & W. (a-b).....	106,549	138,248	641,615	716,701
Penna. (a-c).....	1,150,080	1,238,083	5,340,912	6,225,387
P. & L. E. (a-b).....	539,431	615,433	2,535,719	3,070,143
S. & N. (a-b).....	.....	.....	5,155	9,383
W. Md.....	5,210	8,608	30,197	35,511
Total 10 roads.....	2,337,728	2,540,512	10,886,362	12,343,868
Total Coal and Coke 13 roads:				
January.....			16,421,839	18,936,646
February.....			17,767,381	17,546,496
March.....			19,483,025	17,631,346
April.....			13,429,367	16,850,690
May.....			15,635,568	18,986,796

(a) Includes coal from connecting lines. (b) Includes Company's coal. (c) Does not include company coal hauled free. * Includes company coal for fueling.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended July 15, as follows:

	Surplus	Shortage	Net*
New England Lines	112	58	**54**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	1,445	217	**1,228**
Ohio; Indiana; Michigan; Western Pennsylvania	3,172	178	**2,994**
West Virginia, Virginia, North & South Carolina	851	1,050	199
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	535	110	**425**
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,717	37	**1,680**
Montana, Wyoming, Nebraska	268	0	**268**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,601	46	**2,555**
Texas, Louisiana, New Mexico	330	5	**325**
Oregon, Idaho, California, Arizona	2,172	125	**2,047**
Canadian Lines	0	0	0
Totals	13,203	1,826	**11,377**

	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 14	June 30
Surplus	12,151	12,243	17,867	21,845	12,267	11,098	11,055
Shortage	3,509	7,196	3,776	2,196	4,226	2,033	2,821
Net*	**8,642**	**5,047**	**14,091**	**19,649**	**8,041**	**9,065**	**8,234**

***Bold face** type indicate a surplus.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for June and first six months of this year and last year in short tons:

	June		Six Months	
	1913	1912	1913	1912
Anthracite	776,237	883,326	5,418,231	4,572,269
Bituminous	4,189,969	3,562,845	24,282,419	22,519,781
Coke	1,161,521	1,033,381	7,386,908	6,374,293
	6,127,727	5,479,552	37,087,558	33,466,343

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending July 26:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	80	80	80	87	80
American Coal Products Pref.	105	105	105	109½	105
Colorado Fuel & Iron	32⅝	29½	32	41⅞	24⅝
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	102¼	102¼	102¼	102¼	102¼
Lehigh Valley Coal Sales	195	190	190	....	....
Island Creek Coal Com	49	48	49	....	....
Island Creek Coal Pref.	79½	79	79	....	....
Pittsburgh Coal	18⅝	17	18½	24⅜	14½
Pittsburgh Coal Pref.	83½	82	82½	95	73
Pond Creek	17¼	16½	17	23⅜	16½
Reading	162⅜	159⅝	161⅝	168⅞	151⅜
Reading 1st Pref.	....	....	86	92½	86
Reading 2nd Pref.	89½	88½	89½	95	84
Virginia Iron, Coal & Coke	....	....	37⅞	54	37½

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93½	97	95½	95½	93⅜	99½
Colo. F. & I. gen. 6s	102½	..	107¼	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	80½	81	81	81	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	85	June '11	..	..
Cons. Coal 1st and ref. 5s	..	92½	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	100	102¾	April '06	..	..
K. & H. C. & C. 1st s f g 5s	..	96	98	Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	86½	June '13	86	87½
St. L. Rky. Mt. & Pac. 1st 5s	72	79	73	73	73	80
Tenn. Coal gen. 5s	99½	99⅞	99⅞	July '13	99⅜	103
Birm. Div. 1st consol. 6s	100½	101½	101	April '13	101	103
Tenn. Div. 1st g 6s	100½	101½	100½	July '13	100½	102
Cah. C. M. Co. 1st g 6s	..	103	110	Jan. '09	..	..
Utah Fuel 1st g 5s	..	..	....	....	....	....
Victor Fuel 1st s f 5s	..	80	80	May '13	79⅜	80
Va. I. Coal & Coke 1st g 5s	92½	92½	93	July '13	92	98

DIVIDENDS

St. Louis, Rocky Mountain & Pacific—Dividend No. 1 on the common of ½% payable July 16 to holders of record July 1.

Jefferson & Clearfield Coal & Iron Co.—Dividend of 2½% on the preferred, payable Aug. 15, to holders of record Aug. 8.

❖

Alabama Consolidated Coal & Iron Co.—The net earnings of this concern, which is now in bankruptcy, are at the rate of $240,000 a year, which is more than sufficient to pay the fixed charges and the full dividend of 7% on the preferred stock. Since neither of these payments are being met, the earnings must apparently be applied to the improvement of the property.

American Coal—This concern operates mines at Barton and Lonaconing, Md.; also in the Pocahontas region, West Virginia. It was originally incorporated in Maryland and reincorporated in 1903, in New Jersey. During the period from 1894 to 1900, it paid dividends ranging from 6½ to 10 per cent., and from 1900 to 1909, at the rate of 10 per cent.; since that time the dividend distribution has been 6 per cent. per annum.

FOREIGN MARKETS

BELGIUM

Belgium imports and exports for May and the first five months of the year were as follows:

	Exports May 1913	Exports 5 Months 1912	Exports 5 Months 1913	Imports May 1913	Imports 5 Months 1912	Imports 5 Months 1913
Coal	418,661	2,051,833	1,952,476	677,339	3,232,351	3,821,198
Coke	90,441	385,716	423,092	92,927	370,540	535,789
Briquettes	54,349	287,675	216,618	34,972	166,215	201,107

BARCELONA

A consular report says: "The quantity of coal discharged in Barcelona in 1912 totalled 1,032,954 metric tons (of 2204.6 lb.), which was in excess of the arrivals of coal in any previous year. Of the quantity stated, 649,351 tons came from Great Britain, 83,346 tons from Rotterdam, 8275 tons from Belgium, and 1832 tons from Philadelphia, the rest being Austrian coal of Spanish production. In 1911 the arrivals of coal in Barcelona totaled 930,389 metric tons."

COAL FREIGHT DECISIONS

I. C. C. Nos. 4947—5078—5079, Sheridan (Wyo.) Chamber of Commerce vs. Chicago, Burlington & Quincy R.R.

Complaint was made of the rates on coal from Sheridan, Wyo., to points in Nebraska and South Dakota on the line of the Chicago & North Western and the Chicago, Milwaukee & St. Paul, and to points east and west of Billings, Mont., on the line of the Northern Pacific. Comparisons are made of distances and rates from Sheridan, Hudson, and from Illinois and Indiana coal fields to points of destination on the Chicago & North Western herein involved. Similar comparisons are made of distances and rates from Sheridan, Roundup, Mont., and from Illinois coal fields to points of destination on the Chicago, Milwaukee & St. Paul herein involved. Sheridan mines are at a disadvantage of from 85c. to $1 in competing at points on the Northern Pacific with the mines located on that railroad. **Held:**

1. The great discrepancy between the rates from Sheridan and from Hudson to the same points of destination on the Chicago & North Western and between rates from Sheridan and Roundup to the same points of destination on the Chicago, Milwaukee & St. Paul cannot be justified on the ground that the movement from Sheridan involves a two-line haul.
2. Where the physical connection between connecting carriers is as simple as in these small Western towns, involving no expensive terminal service, the additional cost due to the switching movement is very small, so small in fact that it may not properly be made the basis of an additional charge for a two-line haul of substantial length.
3. The facts in these cases demonstrate the necessity of promulgating rates which will allow this coal to find a market in the territory described. In order to accomplish this result there must be a free interchange of traffic at reasonable joint rates.
4. Joint rates should be established from the mines at Sheridan to the points on the Chicago & North Western which have been specified in the complaint in No. 4947, which should in no case exceed the rate from Hudson, Wyo., to the same points of destination, except that the rate to common points of the Chicago, Burlington & Quincy and the Chicago & North Western need not be changed.
5. A joint rate should be established from Sheridan to Chamberlain, S. Dak., not to exceed that from Roundup to Chamberlain and this rate should be carried back as far as Okaton, S. Dak.
6. A differential of 25c. is a reasonable allowance for the difference in the distance from Sheridan and from the Northern Pacific mines to points of destination involved in No. 5079 within 500 miles of Sheridan. As the distance to points of destination increases, the differential between the rates from Sheridan and from Red Lodge should be further contracted, so as not to exceed 15c. to points between 500 and 600 miles distant and not to exceed 5c. to points between 600 and 700 miles distant. To points over 700 miles distant the rate from Sheridan should be the same as the rate from Red Lodge. **Opinion No. 2290.**

CURRENT COAL LITERATURE

We will furnish copy of any article (if in print) in the original language for the price quoted. Where no price is quoted, the cost is unknown. Inasmuch as the papers must be ordered from the publishers, there will be some delay for foreign papers. Remittance must be sent with order.

ACCIDENTS AND THEIR PREVENTION

Preventing Roof Falls in Mines by Using Cement. Black Diamond, June 21, 1913; 1¼ pp., illus. 20c.

Accidents in Montana Mines in 1912; Carelessness Largely the Cause. Wm. Walsh. Min. and Eng. Wld., July 12, 1913; ¾ p. 20c.

BLASTING, EXPLOSIVES

The Analysis of Black Powder and Dynamite. W. O. Snelling and C. G. Storm. Bureau of Mines, Bull. 51; 71 pp., illus.

Suggestions Governing Safe Use of Explosives in Mines. Wm. Walsh, Min. & Eng. Wld., June 14, 1913; ¾ p. 20c.

Study of Magazines for Black Powder. Report of the Droitaumont tests under the Permanent Commission for Scientific Investigation of Gas, and Explosives. (Etude des Dépots de Poudre Noire.) Saladin and Dautriche. Annales des Mines, Vol. 3, No. 1, 1913, 40 pp., ill.

BRIQUETTES

Briquette Manufacture in Nova Scotia. Coal & Coke Op., June 14, 1913; ½ p. 20c.

Briquetting Coal. Coll. Engr., July, 1913; 2¼ pp., illus. 40c.

COAL DUST

The Combustion of Oxygen and Coal Dust in Mines. Discussion of Mr. Blackett's paper. Jas. Ashworth. Coll. Engr., July, 1913; 1¼ pp. 40c.

COKE

Ammonia Stills in Byproduct Coke Oven Plants. A. Thau. Iron Coal Tr. Rev., June 27, July 4 and 11, 1913; 8¼ pp., illus. $1.

A New Device for Waste Heat Recovery. A. T. Shurick. Coal Age, June 7, 1913; 1¾ pp., illus. 10c.

Beehive and Byproduct Coke in Alabama. H. S. Geismer and D. Hancock. Coal Age, June 7, 1913; 4 pp., illus. 10c.

Coke Oven Carbonization. (Paper read by W. Chaney at annual meeting of I. G. E., June, 1913.) Gas World, June 21, 1913; 7½ pp., illus. 40c.

Coppee Patent Coke Screening and Loading Machine. Gas World, June 7, 1913; ½ p., illus. 40c.

Development of the Coke Oven Gas Aspirator. (Die Entwicklung der Kokereigasauger.) A. Thau. Glückauf, June 7, 1913; 10 pp., illus. 40c.

Goodall's Coke-Quenching, Screening and Loading Machine. Gas World, June 7, 1913; 1¼ pp., illus. 40c.

Improving Coke from Beehive Ovens. N. G. Alford. Coal Age, June 7, 1913; 2¾ pp., illus. 10c.

Investigation of Coal in Byproduct Coke Oven Practice. Describes different forms of coal analysis and estimation. (Die Untersuchung der Steinkohle in der Praxis des Kokereibetriebes mit Gewinnung der Nebenprodukte.) A. Rzehulka. Zeit. des Oberschl. Berg-u. H. Vereins, June, 1913; 7¾ pp., illus. 40c.

Production of Ammonium Sulphate by Means of the Sulphur Contained in Coke-Oven Gases. Communication from the Coke Works Commission. (Ueber die Gewinnung von Ammoniumsulfat mit Hilfe des in den Kokereigasen enthaltenen Schwefels.) J. Reichel. Stahl u. Eisen, June 12, and 19, 1913; 8¼ pp., illus. 80c.

The Pishel Coking Test. M. A. Pishel. Coll. Engr., July, 1913; 5¼ pp., illus. 40c.

The Modern Byproduct Coke Oven. (Paper by C. A. Meissner read before A. I. & S. I. meeting May, 1913.) Iron Coal Tr. Rev., June 13. 1913; 1¾ pp. 40c.

Coppee Byproduct Coke Oven Installation at Lancaster's Steam Coal Collieries, Cwmtillery. Iron Coal Tr. Rev., June 27, 1913; 3 pp., illus. 40c.

DRAINAGE, PUMPING, ETC.

An Oklahoma Water Hoist. E. C. Reeder. Coal Age, June 28, 1913; 1¾ pp., illus. 10c.

ELECTRICITY

Electricity in Coal Mines. Elec. Rev., March. 1913; 7½ pp., illus. 20c.

Electrically Equipped Coal Mines in Nova Scotia. C. H. Wright. Elec. Wld., Feb. 1, 1913; 2¾ pp., illus. 20c.

Electrical Plant at Dalbeath Colliery. (Paper read by W. M. Peat before the East of Scotland Branch of the A. M. E. E.) Iron Coal Tr. Rev., July 4, 1913; ½ p. 40c.

Insulated and Bare Copper and Aluminum Cables for the Transmission of Electrical Energy, with Special Reference to Mining Work. (Paper read by B. Welbourn before I. M. E.) Coll. Guard., June 13, 1913; 1¼ pp., illus. 40c.

Influence of Hydro-Electric Power on Coal Trade. Black Diamond, June 14, 1913; 1½ pp. 20c.

Pressure Regulation for Hydro-Electric Plants. C. A. Tupper. Min. and Eng. Wld., June 21, 1913; 4 pp., illus. 20c.

Use of Purchased Power in Coal Mines. H. D. Jackson. Coal Age, June 28, 1913; 2 pp., illus. 10c.

Electric Wiring in Mines. C. M. Means. Coal Tr. Bull., June 6, 1913; 1½ pp. 25c.

EXPLOSIONS

A Record of the Origin of the Principle of Stonedusting for the Prevention of Colliery Explosions. (Paper read by W. E. Garforth before the I. M. E.) Coll. Guard., June 6, 1913; ½ p. 40c.

Development of Coal Dust Explosions. (Fourth Report of Explosions in Mines Committee.) Coll. Guard., June 20, 1913; 3½ pp., illus. 40c.

Explosions at the Cadeby Main Colliery. Coal Age, June 21, 1913; 3½ pp., illus. 10c.

Imperial No. 3 Mine Explosion. Coll. Engr., July, 1913; 1¾ pp., illus. 40c.

The Scott Colliery Disaster. Coll. Engr., July, 1913; 1¼ pp., illus. 40c.

FUEL TESTING

Methods and Results in Testing Fuels. Communication from the Royal Material Testing Laboratory at Berlin-Lichterfelde-West. (Verfahren und Ergebnisse der Prüfung von Brennstoffen.) Dr. F. W. Hinrichsen and S. Taczak. Glückauf, May 17, 24 and 31, 1913; 13 pp., illus. $1.20.

GENERAL

A Notable Scottish Colliery. First Worked before the 13th century, now equipped with most modern machinery giving large output. Coll. Engr., July, 1913; 3 pp., illus. 40c.

Assessing and Taxing Coal in the Ground. Wm. Griffith. Coll. Engr., July, 1913; 1½ pp. 40c.

Coal Mines Operated by Bureau of Mines. Min. and Eng. Wld., June 13, 1913; 1½ pp. 20c.

Colliery Practice in Concreting. E. E. Seelye and A. T. Shurick. Coal Age, June 7, 1913; 3¼ pp., illus. 10c.

Eastern Kentucky Coal and the Panama Canal. G. D. Crain, Jr. Coal & Coke Op., July 3, 1913; 1¼ pp. 20c.

Economy in Purchasing and Using Coal. A. O. Doane. Eng. Mag., June, 1913; 7 pp. 35c.

Examinations for Certificates of Competency under the Coal Mines Act. Iron Coal Tr. Rev., June 13, 1913; 1¼ pp. 40c.

Experiments and Improvements in Prussian Mining Practice During the Year 1912. Copious information on many branches of equipment and methods in coal and other branches of mining. (Versuche und Verbesserungen beim Bergwerksbetriebe in Preussen während des Jahres 1912.) Preus. Zeit. f. B. H. u. S., No. 1, 1913 (Vol. 61); 50½ pp., illus.

Insurance on Mine Property. W. H. Charlton. Coll. Engr., July, 1913; 1 p. 40c.

Kentucky Mines and Workmen's Compensation. (Abstract of paper by K. U. Meguire read before the Kentucky Mg. Inst., May 17.) Coal Age, June 28, 1913; 2¼ pp. 10c.

Map of Ownership in the Upper Silesian Coal District and Vicinity. Large map accompanied by descriptive and tabulated matter. (Uebersichtskarte der Besitverhältnisse im oberschlesischen Steinkohlenrevier und in den Nachbarbezirken.) R. Michael. Zeit. des Oberschl. Berg- u. H. Vereins, June, 1913; 6¾ pp. illus. 40c.

Manure as a Protection for Concrete. N. G. Alford. Coal Age, June 21, 1913; 2½ pp., illus. 10c.

Notes on the Groundhog Coal Field. Amos Godfrey. Coal Age, June 28, 1913; 1¼ pp., illus. 10c.

Reinforced Concrete in Mines. (Abstract of paper read by Prof. F. M. Dixon, June 16, before the So. Staffs. and Warwickshire Inst. of M. E.) Iron Coal Tr. Rev., June 20, 1913; ½ p. 40c.

The Collieries of South Africa. Description of the Breyten Collieries. So. African Eng., May, 1913; 1 p., illus. 40c.

The Earning Power of Chemistry in the Coal Mining Industry. E. M. Chance. Coll. Engr., July, 1913; 1¾ pp. 40c.

The Russian Coal Syndicate "Prodoogol." Iron Coal Tr. Rev., June 27, 1913; ¾ p. 40c.

The Mineral Production and Resources of China. T. T. Reed. Trans. A. I. M. E., 1913; 48 pp., illus.

The Number of Unprofitable Bituminous Mines. Black Diamond, July 12, 1913; 1¼ pp. 20c.

GEOLOGY

Geology of the Pittsburgh Coal Beds. (Address by J. W. Boileau at C. M. I. A. meeting held at Pittsburgh, June 17.) Coal & Coke Op., June 19, 1913; 1½ pp. 20c.

Southern Extension of the Hainaut Coal Basin. (L'Extension Meridionale du Bassin houiller du Hainaut.) Réne Cambrier. Pub. Asso. Ing. de L'Ecole des Mines de Mons, Vol. V, No. 4; 23 pp.

Structure of the South Edge of Charleroi and Central Coal Basins, Belgium, Parts I and II. (Structure du bord sud des Bassins de Charleroi & du Centre.) X. Stanier. Ann. des Mines de Belgique, Vol. XVIII, Nos. 1 and 2, 1913; 77 pp., illus.

The Concealed Coal Field of Yorkshire and Nottingham. (From memoir of Geol. Sur. England and Wales.) W. Gibson. Coll. Guard., June 13, 20, 27, July 4 and 11, 1913; 6¾ pp., illus. $1.50.

The Profile of the Fat Coal Part of the Bergmannsglück and Westerholt Mines. (Das Profil der Fettkohlenpartie auf den Schachtanlagen Bergmannsglück und Westerholt der Königlichen Berginspektion 3, Buer.) Mentzel. Glückauf, Jan. 11, 1913, 6 pp., ill. 40c.

HOISTING AND HAULAGE

An Adequate Winding Engine Brake. Min. Eng., July, 1913; 3½ pp., illus. 40c.

Splicing Transmission Rope. Eng. & Min. Jl., July 19, 1913; 1¼ pp., illus. 25c.

Three-Two Method of Rope Splicing. Alex Wilson. Coll. Engr., July, 1913; 1 p., illus. 40c.

Wire Ropes Applied to Mining. Sci. & Art Min., June 21, 1913, ¾ p., illus. 40c.

An Italian Aërial Tramway. Coal Age, June 28, 1913; 4¼ pp., illus. 10c.

Underground Conveying. (Paper by S. Mavor, read before the South Wales Inst. of Engrs.) Coll. Guard., May 30, June 6, 13 and 27, 1913; 3 pp., illus. $1.20.

LIGHTING

The Flash Point of Oils. I. C. Allen and A. S. Crossfield. Bureau of Mines, Tech. Paper 49; 19 pp., illus.

Mixed Lights in Mining. J. T. Beard. Coal Age, June 14, 1913; 1 p. 10c.

A New Mining Lamp. Coal Age, June 21, 1913; ¾ p., illus. 10c.

MINE GASES, TESTING

An Investigation into the Effect of Atmospheric Pressure on the Height of the Gas-Cap. C. J. Wilson. Trans. Min. Inst. of Scotland, Vol. XXXV, Part 3, 11½ pp., illus.

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Taking Screenings from Wagon-Loading Chutes. Black Diamond, July 12, 1913; ¾ p., illus. 20c.

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Combination Picking Tables and Loading Booms. F. C Perkins. Coal & Coke Op., July 10, 1913; 1¼ pp., illus. 20c.

Shaking Screens in a Concrete Tipple. O. G. Petersen. Coal Age, June 21, 1913; 2½ pp., illus. 10c.

SAFETY APPARATUS

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Mine-Rescue Van for South Staffordshire. Coll. Guard., June 13, 1913; ¾ p., illus. 40c.

Safety Electric Switches for Mines. H. H. Clark. Bureau of Mines, Tech. Paper 44; 4 pp.

Safety Clutches and Hoisting Controllers Make Mine Elevators Safe. Coal Tr. Bull., July 15, 1913; ½ p. 25c.

Safety Made the First Consideration. Thos. W. Dawson, Coal Tr. Bull., June 16, 1913; 5¼ pp. 25c.

The Reopening of Norton Colliery with Self-Contained Breathing Apparatus After an Explosion. (Paper by J. R. L. Allott read before the I. M. E.) Coll. Guard., June 6, 1913; 1¼ pp. 40c.

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Bath House at Cameron Colliery. Coll. Engr., July, 1913; 1¼ pp., illus. 40c.

Baths for Miners. (Address by Wm. Walker before Scottish Federated Inst. of Min. Students.) Iron Coal Tr. Rev., July 11, 1913; 1¼ pp. 40c.

H. C. Frick Welfare Plans. Coal Age, June 21, 1913; ½ p. illus. 10c.

State Miners' Hospital at Fairmont, W. Va. A. W. Hesse. Coal Age, June 14, 1913; 2¼ pp., illus. 10c.

SHAFTS, SHAFT SINKING

The Shaft Plant VIII, IX of Constantine the Great Colliery. (Die Schachtanlage VIII/IX der Zeche Constantin der Grosse.) Illgen and Wollenweber. Glückauf, May 24 and 31, 1913; 15 pp., illus. 80c.

SIGNALING

A New Mine-Rescue Telephone. Coal Age, June 21, 1913; 1¼ pp., illus. 10c.

Wireless Telephone for Pit Use. O. Dobbelstein. Iron Coal Tr. Rev., June 6, 1913; ¾ p., illus. 40c.

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Exhaust Steam Plant at Scottish Collieries. Coll. Guard., July 4, 1913; 1 p., illus. 40c.

Erecting an Engine Underground. B. J. Lowe. Coal Age, June 21, 1913; 1½ pp., illus. 10c.

The Slow Combustion of Coal Dust and its Thermal Value. (Paper read by F. E. E. Lamplough and A. M. Hill before the I. M. E.) Coll. Guard., June 6, 1913; 1 p., 2 tables. 40c.

The Use of Lignite Coals as Fuel for Locomotives. (Paper read by S. B. Flagg before the Intl. Ry. Fuel Assn., May 21), Black Diamond, July 5, 1913; 2½ pp., illus. 20c.

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German Practice in Coal Stores. Eng. Rev., Apr. 15, 1913; 1¼ pp., illus. 40c.

Value of Storage Space and How to Obtain It. H. J. Edsall. Black Diamond, June 21, 1913; 1¼ pp., illus. 20c.

WORKING OF MINERALS

An Ideal Method of Mining. J. C. Edwards and H. M. Gibb. Coll. Engr., July, 1913; 4¼ pp., illus. 40c.

Recent Developments in Open-Cut Coal Mining in Kansas. W. S. Russell. Excavating Engr., April, 1913; 5 pp., illus. 20c.

A Modern Coal Stripping Plant near Pittsburg, Kansas W. S. Russell. Excavat. Engr., July, 1913; 2¾ pp., illus.

VENTILATION

Improvements Relating to the Anemometer and Hygrometer. Henry Briggs. Trans. Min. Inst. of Scotland, Vol XXXV, Part 3; 5½ pp., illus.

Reversing the Ventilation. G. G. Bourne. Min. Eng., July, 1913; 1 p., illus. 40c.

The Measurement of Air in Mines. (Paper read by Prof. H. Louis at meeting of Colliery Undermanagers.) Coll. Guard., June 20, 1913; 1½ pp., illus. 40c.